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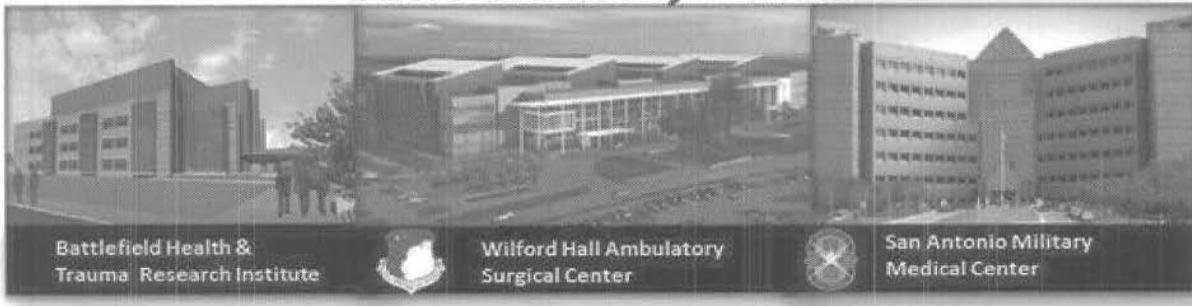
U.S. AIR FORCE



CAPABILITIES AND COLLABORATION GUIDE



San Antonio, Texas



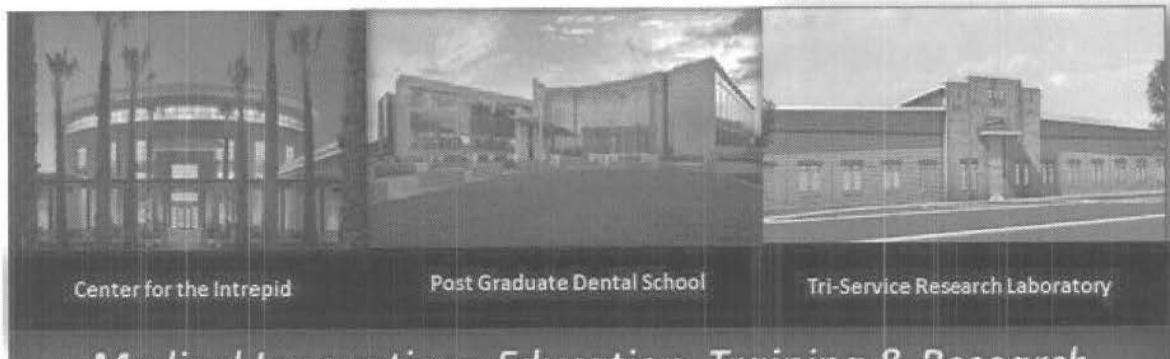
Battlefield Health &
Trauma Research Institute



Wilford Hall Ambulatory
Surgical Center



San Antonio Military
Medical Center



Center for the Intrepid

Post Graduate Dental School

Tri-Service Research Laboratory

Medical Innovation: Education, Training & Research

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Forward

This guide is a quick reference to the numerous specialized capabilities and collaborations involved in military medical research in and around the San Antonio, Texas, area. This is a living document that will be updated as new collaborators are identified. Additional information regarding the 59th Medical Wing, our office and research portfolio is provided at:
<http://www.59mdw.af.mil/Home.aspx>; <http://www.59mdw.af.mil/Units/ChiefScientist-ST.aspx>;
<https://kx.afms.mil/kj/kx8/59MDWScienceAndTechnology/Pages/home.aspx>;

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Chief Scientist, 59th Medical Wing

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59th Medical Wing

"Warrior Medics – Mission Ready –Patient Focused"

MISSION: Developing Warrior Medics through Patient Centered Care.

VISION: The 59 Medical Wing demonstrates Exemplary Care and Global Response.

San Antonio Military Health System

MISSION: As an integrated system, the San Antonio Military Health System provides safe, accessible, high quality patient-centered care and promotes patient health, readiness, education & training, and research.

VISION: To be the DoD's premier System for Health and our patients first choice for healthcare.

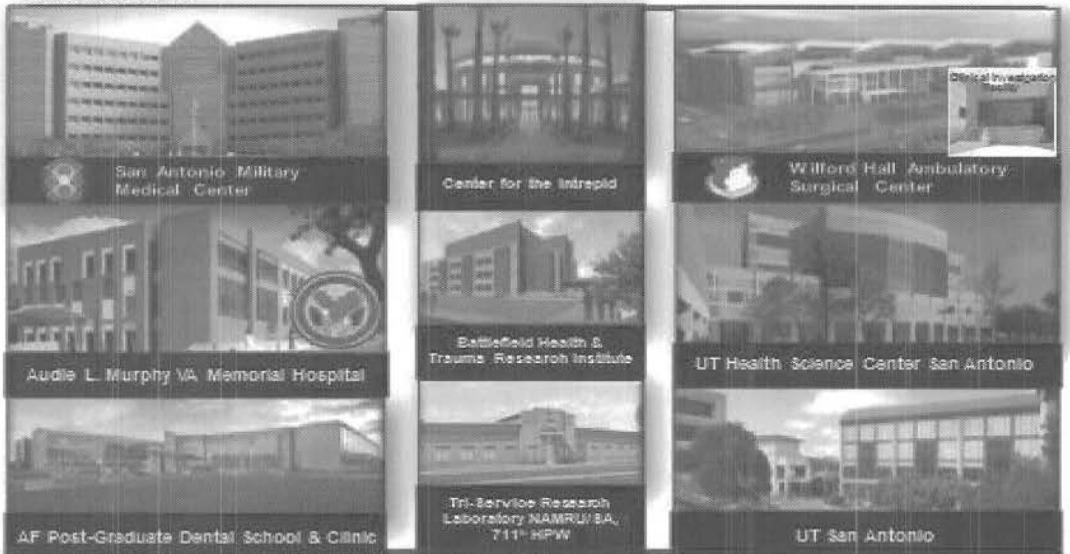
PERFORMANCE PLEDGE: The San Antonio Military Health System team promises to provide exemplary healthcare and promote a healthy community. We pledge to our beneficiaries and partners to provide a safe, high-quality, and positive experience that is patient-centered and family-supportive. As members of a strong inter-service team, we are committed to you and your health.



San Antonio Military Medical Research

Strong DoD-Federal-Academia-Industry Synergy

U.S. AIR FORCE



Integrity - Service - Excellence

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Research Alignment

Modernization Thrust Areas

MTA	Program Alignment – 59MDW
 En Route Care	Impact of Transport Patient Safety En Route Medical Technologies
 Expeditionary Medicine	Suspended Animation Regenerative Medicine Vascular Injury and Forward Damage Control Surgery Trauma, Hemostasis and Resuscitation
 Force Health Protection	Health Surveillance, Infection, Injury & Immunity Directed Energy Technologies Development and Assessment
 Operational Medicine	Personalized Medicine Population Health Chronic Pain & Substance Abuse Training & Simulation

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FACT SHEET

59 MDW Chief Scientist's Office

*Science and Technology – Providing operational capability through
Education, Training and Research*

The 59th Medical Wing Chief Scientist's Office (59MDW/ST) provides the strategic vision, direction, oversight, project management support and technical resources to advance medical modernization efforts with a unique focus on research activities. The Clinical Research Program is requirements driven to address Air Force unique, Joint and Coalition scientific needs in trauma critical care, clinical and rehabilitative medicine, diagnostics, therapeutics and medical modeling and simulation training aligned to Air Force Medical Service (AFMS) Thrust Areas. Our mission is to advance AFMS capabilities and improve equipment and procedures supporting warfighters in the field and in garrison, their families and beneficiaries by transitioning scientific findings to the operational environment and patient bedside, to best practice.

The 59 MDW/ST provides oversight and support to investigators assigned to the 59 MDW, the San Antonio Military Medical Center (SAMMC), San Antonio Military Health System (SAMHS), Joint Base San Antonio (JBSA) and affiliated organizations. Research programs include the Air Force En Route Care Research Center, Trauma and Clinical Care Research Program, and the Restoration/Regenerative Medicine Research Program conducted at the US Army Institute for Surgical Research (USAISR)/Battlefield Health and Trauma Research Institute (BHT)(USAISR/BHT), JBSA-Fort Sam Houston, TX, the Navy Medical Research Unit-San Antonio, JBSA-Fort Sam Houston TX, and the 59 MDW/ST Clinical Research Division, Wilford Hall Ambulatory Surgical Center, JBSA-Lackland, TX.

Collaborators include the 711th Human Performance Wing (711HPW) Wright Patterson AFB OH, JBSA - Fort Sam Houston TX and JBSA-Lackland TX; 42nd Medical Group (MDG), Maxwell AFB AL; 99 MDG, Nellis AFB NV; 779 MDG, Joint-Base Andrews MD; 81 MDG, Keesler AFB MS; Tripler Army Medical Center HI; Landstuhl Army Medical Center GE; Walter Reed National Military Medical Center. Clinical Investigation Program (CIP) activities are part of the 59 MDW/ST portfolio and managed by the 59 Clinical Research Division in support of Graduate Health and Science Education (GHSE) and Readiness Training. Nursing research is aligned under ST with activities managed by the Nursing Research Division. Dental research is also part of the wing portfolio, and directed by the Dean, Air Force Post-Graduate Dental School and Clinics, and the Commander, Dental Evaluation and Consultative Service located at the BHT, JBSA-Fort-Sam Houston, TX.

Additionally, this office established the 59MDW Scientific Advisory Council and the SAMHS Research Consortium (SRC) with our Service, Academia and Industrial partners; ST authored the charter for the SRC (in formal staffing). Furthermore, this office participates in various meetings and workgroups:

- Armed Services Biomedical Research Evaluation and Management Community of Interest (ASBREM COI)
- Defense Health Agency Service Work Groups
- Air Force Chief Scientist's Group (AF/ST CSG)
- Defense Medical Research and Development Program (DMRDP)
- Joint Program Committees (JPCs)
- AFMS Research and Technology Advisory Board (RTAB)
- AFMS Medical Research and Acquisitions Working Group (MRAWG)
- Air Force Surgeon General's Human and Animal Research Panel (SGHARP)
- Air Mobility Command (AMC) Surgeon General's Aeromedical Research Oversight Committee (AEROC)

FACT SHEET

Audie L. Murphy Veteran Administration Center at San Antonio, Texas

MISSION: To fulfill President Lincoln's promise "To care for him who shall have borne the battle, and for his widow, and his orphan" by serving and honoring the men and women who are America's veterans.

South Texas Veterans Health Care System

- South Texas Veterans Health Care System (STVHCS) is comprised of two inpatient campuses: the Audie L. Murphy Memorial Veterans Hospital in San Antonio and the Kerrville VA Hospital in Kerrville, Texas. STVHCS serves one of the largest primary service areas in the nation and is part of the VA Heart of Texas Veterans Integrated Service Network (VISN 17), with offices located in Arlington, Texas. South Texas provides health care services for 80,000 unique Veterans.
- The Audie L. Murphy Memorial Veterans Hospital (ALMMVH), named after the nation's most decorated World War II hero, is a quaternary care facility, which is affiliated with the University of Texas Health San Antonio (UTHSA). Comprehensive health care is provided through acute medical, surgical, mental health, physical medicine and rehabilitation, geriatric, and primary care services. Comprised of a Spinal Cord Injury Center, a Community Living Center, a Domiciliary, and a Substance Abuse Residential Rehabilitation Treatment Program (SARRTP). ALMMVH provides quaternary services including bone marrow transplantation, open-heart surgery, magnetic resonance imaging and positron emission tomography. As a Level II Research facility ALMMVH has projects that include aging, cardiac surgery, cancer, diabetes and HIV. The facility has one of three National Institutes of Health sponsored clinical research centers in the VA. In addition, the Geriatric Research, Education & Clinical Center (GRECC) is a "Center of Excellence."
- The Kerrville VA Hospital (KVAH), located 65 miles northwest of San Antonio, provides primary care, some specialty care, geriatric evaluation and management, palliative care, and long-term care services with a Community Living Center. Outpatient clinics offer primary care and some specialty care while sharing resources with each other and their respective communities. When required, Veterans are referred to ALMMVH or KVAH for specialty care including medicine, surgery, neuropsychiatry, rehabilitation, spinal cord injury, and long-term care services.

CORE VALUES:

- **Compassion:** We will treat all veterans and their families with the utmost dignity and compassion. We will provide services in a caring manner, with a sympathetic consciousness of others' distress together with a desire to alleviate it.
- **Commitment:** Veterans have earned our gratitude and respect. Their health care, benefits, and memorial service needs to drive our actions.

- **Excellence:** We strive to exceed the expectations of veterans and their families. We strive to perform at the highest level of competence and take pride in our accomplishments.
- **Professionalism:** Our success depends on maintaining a highly-skilled, diverse, and compassionate workforce. We foster a culture that values equal opportunity, innovation, and accountability.
- **Integrity:** We recognize the importance of accurate information. We practice open, truthful, and timely communication with veterans, employees, and external stakeholders. By carefully listening and responding to their concerns, we seek continuous improvement in our programs and services.
- **Accountability:** We will perform in a manner at all times that makes us accountable, responsible, and answerable to veterans and their families, our leaders and other employees as well as external stakeholders.
- **Stewardship:** We will ensure responsible stewardship of the human, financial, and natural resources as well as data and information entrusted to us. We will improve performance through the use of innovative technologies, evidence-based medical practices, and sound business principles.

Research Resources: The South Texas Veterans Health Care System (STVHCS) is a major resource for clinical and translational research in San Antonio. The STVHCS Research Programs include Clinical Sciences Research (single-site and multi-site cooperative studies), Biomedical Laboratory Research, Health Services Research, and Rehabilitation Research.

Research Initiatives: STVHCS has an extensive range of active human research protocols (approximately 250 active studies) supported by approximately 100 investigators and 300 research staff). Examples include but not limited to:

- In Clinical Research there are Veteran Administration (VA) Cooperative Trials (prostate cancer, Human Immunodeficiency Virus (HIV), heart disease, diabetes, anticoagulation), VA-funded Clinical studies (diabetes, bipolar disease), Pharmaceutical industry studies (cancer, HIV, mood disorders, diabetes, heart disease, lung disease), and Investigational Drug studies.
- In Biomedical Laboratory Research there are VA-funded studies and National Institute of Health (NIH)-funded studies. There are approximately 70 approved animal protocols being conducted within the STVHCS. In addition, there are 2 VA Research Centers (Neurodegeneration and HIV/AIDS) which were funded through 2011.
- In Health Services Research there is a Research Enhancement Award Program with a number of VA-funded Investigators entitled the Veterans Evidence-based Research, Dissemination, and Implementation Center (VERDICT).
- The Rehabilitation program operates a fully equipped gait analysis laboratory to investigate the effects of prosthesis design on amputee recovery and functional status.
- The system dedicates 9,000 sq. ft. of space to the VERDICT, 35,000 sq. ft. of wet lab space, and 12,000 sq. ft. for animal research.
- The Veterans Integrated Service Network runs a New Investigator Award program. Over 30 new investigator awards have been made to STVHCS researchers since 1998; of these young investigators 70% have been successful in gaining future VA or NIH support.

For more information, visit <http://www.southtexas.va.gov/about/index.asp>

FACT SHEET

Battlefield Health and Trauma Research Institute and U.S. Army Institute of Surgical Research

MISSION: Optimizing Combat Casualty Care

VISION: The Nation's Premier Tri Service research organization that integrates safety into planning and executing registry-based and translational Research providing innovative solutions for burn, trauma, and combat casualty care from time of injury through rehabilitation.

USAISR is one of six research laboratories within the U.S. Army Medical Research and Materiel Command (USAMRMC). The unit directs research to better understand and develop solutions for clinical problems identified on the battlefield and then validate the solutions before implementing them on the battlefield as medical doctrine. The unit also provides medical care for burn and trauma patients and training for medical professionals.

- USAISR is a highly decorated and celebrated unit. The institute has been involved in Humanitarian missions overseas that include the Union of Soviet Socialist Republics (USSR) in 1989, Guam in 1997, and Honduras in 1999.
- The unit utilized its expertise by caring for burn casualties from every conflict since World War II to the present Operation Enduring Freedom.
- The Army Superior Unit Award was awarded to USAISR for outstanding meritorious conduct in support of Operation Iraqi Freedom during the period of January 13, 2003 to December 31, 2004.
- USAISR's vision is to be the Department of Defense (DoD)'s premier combat casualty care research, burn, trauma, and critical care center in support of the medical needs of warfighters and their beneficiaries.
- USAISR's objective is to integrate all services' combat casualty care research missions/functions into a multifaceted synergistic research capability with a clinical foundation.
- USAISR also is focused on sustaining the DoD's world-class adult burn center and leading the world in burn care research.

History:

- 1943 – The Surgical Research Unit was established at Halloran General Hospital, Staten Island, New York.
- 1947 – The institute became a permanent unit and moved to Brooke General Hospital, Brooke Army Medical Center (BAMC), Fort Sam Houston, Texas. The unit initially studied antibiotics for treating war wounds and expanded to study innovative new surgical techniques and developments.

- **1949** – The unit’s mission was expanded to encompass the study of thermal injury. The advent of improved grafting procedures and continued use of antibiotics in new applications grew along with this mission.
- **1950s** – The unit became a class II activity of the Surgeon General and later was assigned to Headquarters, U.S. Army Medical Research and Development Command. Research flourished, with the institute evaluating the use of plasma extenders, grafting and preservation of blood vessels, and the use of an “artificial kidney,” among other forward-thinking medical research initiatives. As the “Army’s Burn Unit,” this unit has served as a prototype and model for burn units all over the world. During this time, it was also a premier dialysis research center serving South Central Texas and neighboring states.
- **1994** – As part of the Army Medical Department reorganization, the institute became a subordinate command of United States Army Medical Research and USAMRMC. The institute became part of USAMRMC in March 1994 when the Army Medical Department reorganized and the U.S. Army Medical Research and Development Command were re-designated as USAMRMC. The research focus of the mission changed from thermal injury to the full spectrum of combat casualty care.
- **2003** – The USAISR Burn Center and BAMC’s Trauma and Critical Care Service were combined to form the DoD’s only Trauma Division under the direction of the Commander, USAISR.
- **2010** – The Battlefield Health and Trauma Research Institute (“BHT2”) collocates with USAISR (“BHT1”)
- **2011** – The new Battlefield Health and Trauma Research Institute officially opened in February. It houses the Navy Medical Research Unit-San Antonio, the 711 Human Performance Wing (711 HPW) Dental Evaluation and Consultation Service, and the Army Dental and Trauma Research Detachment. The Tri-Service BHT Center will leverage the synergy of clinical care and research to improve battlefield healthcare.
- **Current** – The Tri-Service BHT Center leverages the synergy of clinical care and research to improve battlefield healthcare.

FACT SHEET

USAISR Research Directorate

The U.S. Army Institute of Surgical Research (USAISR) and Brooke Army Medical Center (BAMC) are housed in adjoining buildings. The research facilities consist of two buildings, with a combined total of 269,286 square feet. The research facilities house the USAISR Research Directorate; the U.S. Army Dental and Trauma Research Detachment; the BAMC Department of Clinical Investigation; and the U.S. Air Force En-Route Care and U.S. Navy (NAMRU-San Antonio) research units.

Research at USAISR is coordinated through the Research Directorate, which oversees nine Task Areas totaling approximately 300 personnel: Critical Care Systems, Multi-Organ Support Therapies, Burn Injuries, Systems of Care for Complex Patients, Extremity Trauma and Regenerative Medicine, Coagulation and Blood Research, Damage Control Resuscitation, Tactical Combat Casualty Care (TCCC), and Ocular Trauma. Embedded within Burn Injuries and TCCC, respectively, are the Burn Pain and Battlefield Pain Management research programs. To support these research activities, the Research Directorate maintains a capability for Epidemiology and Biostatics. The Clinical Trials group is comprised of research nurse coordinators and others with expertise in planning and executing clinical trials. Acute Maxillofacial Trauma research is conducted by the Dental Trauma Research Directorate, an activity of the U.S. Army Dental Command housed within USAISR. The research budget at USAISR is approximately \$30M per year of core funds, variably supplemented with extramural grant awards. The majority of core research funds are programmed in conjunction with the Joint Program Committee – 6 (JPC- 6)/Combat Casualty Care Research Program (CCCRP), Headquarters, Medical Research and Materiel Command, Fort Detrick, Maryland. Identified research priorities are intended to close validated gaps in combat casualty care, generally as tangible products (materiel solutions) or knowledge products. Research proposals are vetted by an internal peer-review process coordinated by the CCCRPs.

The Research Directorate has extensive capabilities for, and experience in, the conduct of research associated with: hemorrhagic shock, hemostasis, resuscitation, coagulation and inflammation, burns and inhalation injury, hard- and soft-tissue extremity trauma, regenerative medicine, pain management, craniomaxillofacial trauma, ocular trauma, medical monitoring, and intensive care. USAISR has a central laboratory capable of conducting routine chemistry, blood gas, complete blood counts, hematology, coagulation, microbiology, and histopathology on research samples.

Additional USAISR laboratory capabilities in various laboratories throughout the institute include mRNA and DNA microarray scanning, quantitative real time PCR, flow cytometry, immunophenotypic analysis, mass spectroscopy, high-performance liquid chromatography, and gas chromatography. Further specialized testing may be obtained through collaboration with other

clinical departments, including the Departments of Hematology/Oncology and Allergy/Immunology. Laboratory facilities specifically dedicated to research are also available at BAMC. The USAISR also has significant expertise in trauma informatics and waveform analysis.

Specific research capabilities available at USAISR include:

- Hypovolemia research using a Lower-Body Negative Pressure (LBNP) chamber
- Blast tube research using compressed air to produce waveforms and pressures similar to a free-field blast wave with peak pressures up to 400 kPa and about 2.5 ms to 3 ms duration.
- Intra-vital video-microscopy to perform *in vivo* local measurements of diameter, blood flow, permeability and glycocalyx thickness in microvessels (arterioles, capillaries, venules) of anesthetized animals.
- Gene expression and genomic analysis through use of on-site Agilent Microarray equipment including a dual laser microarray scanner and hybridization oven. The equipment can support both traditional gene expression analysis (at the mRNA or microRNA level).
- Flow Cytometry (e.g., platelet, leukocyte and microvesicle studies) using a variety of instruments
- Microbial biofilm formation and susceptibility testing using both commonly employed static models (96-well microtiter plate/modified MBEC susceptibility plates) as well as dynamic models (flow-cells) *in vitro*.
- Anatomic Pathology services, offering full-service autopsy, necropsy, and histopathology services for both clinical and research customers. The histology laboratory contains three tissue processors capable of handling 200 blocks apiece, two microtomes for sectioning tissue samples at 3 to 4 microns, and one automatic stainer that can handle 20 hematoxylin and eosin (H&E) slides in under 20 minutes. Additional available stains include H&E, Gram, Periodic Acid Schiff (PAS), Masson's trichrome, Gömöri-Grocott methenamine silver (GMS), Movat's Pentachrome, Oil-Red-O, and Warthin-Starry.
- Vivarium facility totaling 49,341 square feet, including 7 operating rooms, a 4-bay animal ICU, computed tomography (CT) scanner, C-arm fluoroscopy, ultrasound, micro-CT scanner, and Xenogen IVIS Spectrum Imaging System. The vivarium can support large (pigs, sheep, and goats), medium (rabbits), and small (mice, rats) animal experiments. The USAISR is fully accredited by the Association for the Assessment and Accreditation of Laboratory Animal Care International (AAALAC International).
- Media Informatics/Knowledge Management Branch to manage general research imagery, radiology images, research records/document management and intranet/web development tasks.

FACT SHEET

U.S. Army Institute of Surgical Research Burn Center

MISSION: The U.S. Army Institute of Surgical Research (USAISR) Burn Center serves as the sole burn center within the U.S. Department of Defense providing comprehensive care to military casualties, beneficiaries, and civilian emergency patients based on state-of-the-science practices and technology fully integrated with combat casualty care research. The Burn Center has been verified by the American Burn Association and the American College of Surgeons Committee on Trauma as having the resources required for providing optimal care to burn patients from time of injury through the rehabilitation phase.

LOCATION AND OTHER FACILITIES: The Burn Center is located in the San Antonio Military Medical Center at JB San Antonio, Fort Sam Houston, Texas. Comprehensive, multidisciplinary care is provided by Burn Center staff consisting of approximately 300 federal employees and contract staff, in concert with consultants from San Antonio Military Medical Center (SAMMC) facilities. The Burn Center staff is assigned to the USAISR, a subordinate command of the U.S. Army Medical Research and Materiel Command (USAMRMC) located at Fort Detrick, MD.

HISTORY: Since 2003, the Burn Center has admitted more than 950 combat casualties related to overseas contingency operations along with an additional 5500 patients from the immediate South Texas area. Critical care provided within the Burn Center leverages state-of-the-science best clinical practices coupled with clinical research to ensure optimal care. Ongoing research activities remain focused on combat casualty care and related priorities of the USAISR, including resuscitation, homeostasis, critical care and functional outcomes of the trauma patient.

- The Burn Center includes a 16-bed Burn Intensive Care Unit (BICU) providing care for patients with severe burns, inhalation injury, toxic epidermal necrolysis, necrotizing fasciitis, and other trauma for which the Burn Center team is optimally positioned to care for. Specialized support services include Extracorporeal Organ Support modalities such as Continuous Renal Replacement Therapy and Extracorporeal Lung Support. A dedicated respiratory therapy service consisting of 16 full-time therapists provides comprehensive pulmonary care, utilizing a variety of ventilators and modalities, including high-frequency percussive ventilation.
- A 24-bed progressive care ward provides either initial or extended care for patients admitted from the Emergency Department or clinic or in transfer from the BICU. The burn rehabilitation service consists of physical and occupational therapists and technicians, including staff with added credentials in hand therapy. Our physical medicine and rehabilitation physician works closely with rehabilitation staff to ensure maximal integration of services for all patients.

- The burn operating room team provides 24/7 staffing to ensure dedicated support for burn casualties for both acute and phased reconstructive operations. Three full-time anesthesiologists provide comprehensive anesthesia support in the operating room and throughout the Burn Center, including acute pain management. Our multi-specialty interdisciplinary team enjoys the active participation of our clinical dietician, psychiatric nurse specialist, social workers and nurse case managers, burn program manager, attending surgeons, internists, physician assistants, fellows, residents, students, and multiple clinical research personnel who round collectively on all patients.

RESEARCH STRATEGY: The clinical research program at the USAISR is dedicated to improving functional survival among military service members and civilians. This effort is executed through the many retrospective and prospective studies, and clinical trials conducted daily by principal investigators and their investigational team. Collaborations between clinical and bench scientists provide rapid, deployable solutions in the form of devices, methodologies and administration of life sustaining patient care.

FACT SHEET

Joint Trauma System (JTS)

Right Patient, Right Place, Right Time, Right Care (R4)

MISSION: To provide evidence-based process improvement of trauma and combat casualty care, to drive morbidity and mortality to the lowest possible levels, and to provide evidence-based recommendations on trauma care and trauma systems across the Department of Defense (DoD).

VISION: Every Soldier, Sailor, Airman, and Marine injured on the battlefield or in any theater of operations will be provided with the optimum chance for survival and maximum potential for functional recovery.

Data collection is the foundation of the JTS. The use of the data by doctors, nurses, analysts, and researchers is changing trauma medicine and combat casualty care, and improving outcomes for the severely wounded warrior. Thus, collection and analysis of patient health data is mission- critical. The vehicle for collecting this data is the Department of Defense Trauma Registry (DoDTR), formerly known as Joint Theater Trauma Registry (JTTR). JTS uses the DoDTR data to develop best practices for multiple levels of care for battle and non-battle trauma patients and providers in austere environments. A multi-disciplinary approach reduces combat morbidity and mortality by identifying trends or gaps in care and bridging the gaps. A decreased case fatality rate of less than 9%, despite increasing acuity of combat injured patients, shows the greatest measurable impact.

JTS is the first to create integrated multi-specialty registries where Health Information Managers obtain the specialty information. For example, JTS combines detailed clinical data from the trauma, orthopedic and infectious disease registries to improve care from point of injury through surgical intervention.

During missions Trauma Medical Director and Trauma Nurse Coordinators are rotated from each service and integrated into the theater of operation to implement the best practices. The next step is to leverage the program to extend its benefits to trauma communities beyond the Theater of War.

DoD TRAUMA REGISTRY (DoDTR): The JTS efforts are supported by the concurrent collection and analysis of data maintained in the Department of Defense Trauma Registry (DoDTR), formerly Joint Theater Trauma Registry (JTTR). The DoDTR is the data repository for DoD trauma-related injuries. The goal of this registry is to document, in electronic format, information about the demographics, injury-producing incident, diagnosis and treatment, and outcome of injuries sustained by US/Non-US military and US/Non-US civilian personnel in wartime and peacetime from the point of wounding to final disposition.

TRAUMA CARE DELIVERY: The DoDTR supports US military performance improvement initiatives with global-wide collection and aggregation of combat casualty care epidemiology, treatments and outcomes. DoDTR data enables JTS to conduct performance improvement studies and gap analyses for medical capabilities to direct ongoing and future combat casualty care research, trauma skills training, and direct combat casualty care. DoDTR data analysis was instrumental in proving the Golden Hour evacuation policy saves lives. DoDTR data also provided the supporting evidence to prompt a doctrinal change of Army flight medics from EMT-Basic to an EMT-Paramedic to improve the survivability of combat casualties. JTS is the first to create integrated multi-specialty registries. These registries are:

- **Acoustic** – Collects data related to acoustic trauma injuries to the inner ear. The registry tracks the patient's acoustic injury, evaluation results, and care management that is not included in initiating DoDTR traumarecord.
- **Infectious Disease (ID)** – Collects trauma-related ID epidemiology; a central repository for bacteria isolates infecting war wounded.
- **Military En Route Care Registry (MERCuRY)** – Collects data about treatment during medical evacuation (MEDEVAC) and Casualtyevacuation (CASEVAC).
- **Military Orthopaedic Trauma Registry (MOTR)** – A registry of military orthopaedic injuries designed to augment the DoDTR for specific orthopaedic information such as injury patterns, fracture characteristics, treatment and complications associated with combat extremity injuries.
- **Pre-Hospital Trauma Registry (PHTR)** – Captures never before attainable prehospital trauma care information provided on the ground at the point of injury by all combat forces.
- **Outcomes (Recovery and Rehabilitation)** – Collects data about a patient's recovery and rehabilitation after he/she leaves the treatment facilities.
- **Traumatic Brain Injury (TBI)** – Collects data related to patients with TBI injuries, ranging from mild concussion to a penetrating head injury.
- **Vision** – Collects ocular clinical data, from injury to treatment to vision recovery.

JTS: THE DOD CENTER OF EXCELLENCE FOR TRAUMA

- **Data Acquisition** – Mines the medical records to abstract, code, and enters critical trauma data into the DoDTR database for use in support of the JTS mission.
- **Data Analysis** – Develops queries and provides data from the DoDTR in response to requests for information. Conducts classified and non-classified data analysis.
- **Data Automation** – Supports the information technology for the DoDTR and data-related special projects. Designs and implements special-project database applications, related architecture, and documentation. Handles documentation needs for JTS to maintain Program compliance with the Defense Health Agency.
- **Performance Improvement** – Coordinates performance improvement (PI) activities across the spectrum of trauma care. Participates in the development, maintenance, and adherence to Clinical Practice Guidelines. Develops PI course content and training, and resolves trauma system patient care issues.
- **Education** – Develops and conducts pre-deployment training of the CENTCOM Joint Theater Trauma System (JTTS) teams, DoDTR user training, and JTS staff training. Develops educational products for COCOM trauma system development. Secures continuing education credits and coordinates performance improvement and other trauma related courses.

Award-Winning Service: JTS won the 8th Annual Major Johnathan Letterman 2015 Medical Excellence Award for excellence in battle field medicine and outcomes.

In 2014, the JTS earned the Force Health Protection Award granted by the Association of Military Surgeons of the United States. The same year JTS received the US Army Surgeon General's prestigious Wolf Pack Quarterly and Annual Awards for superior collaboration and team accomplishment. The award recognized the collection and analysis of trauma data from the DoDTR to formulate enhanced CPGs which reduced morbidity and mortality of casualties to the lowest level in history. The JTS is recognized as a Defense Center of Excellence, one of only seven DoD entities to receive the honor.

JTS Fosters Innovation: In 2014, the JTS earned the Force Health Protection Award granted by the Association of Military Surgeons of the United States. The same year JTS received the US Army Surgeon General's prestigious Wolf Pack Quarterly and Annual Awards for superior collaboration and team accomplishment. The award recognized the collection and analysis of trauma data from the DoDTR to formulate enhanced CPGs which reduced morbidity and mortality of casualties to the lowest level in history.

DoD Center of Excellence: The JTS is recognized as a Defense Center of Excellence, one of only seven DoD entities to receive the honor.

- The DoD supports trauma care research to increase readiness and decrease injuries and preventable death, while improving health and quality of life for those Service members who have suffered traumatic injuries.
- Trauma initiatives focus on the prevention, diagnosis, mitigation, treatment of trauma injuries, and rehabilitation of injured Service members.
- The DoD uses a central trauma data repository to standardize and facilitate performance improvement.
- Trauma-related data through the full spectrum of military operations is gathered and analyzed in order to exchange information across the DoD, and across national and international trauma communities of interest.
- The DoD identifies, tracks, and recommends performance improvement measures to ensure the appropriate evaluation and treatment of injured Service members across the continuum of care.

JTS BRANCHES

Data Acquisition: This team is responsible for data abstraction and entry of concurrent and retrospective records into DoDTR, as well as the quality assurance of the data. It is responsible for creating and updating the DoDTR data definitions and business rules. Data Acquisition also provides support applications and services to DoDTR users.

Data Analysis (Special Projects): This group manages the data sharing agreements process and provides the DoDTR data in response to data requests. It conducts classified and non-classified data analysis for internal and external requests for research purposes.

Automation: The Automation Branch supports the information technology needs of the DoDTR and data-related special projects. The team creates proof of concept and prototypes, and implements database applications and related architecture. It also handles the documentation needs of JTS and delivers educational literature to allow users to fully leverage the DoDTR registries.

Education: The educational arm of JTS cultivates and conducts pre-deployment training of the US Central Command, JTTS teams, DoDTR user training, and JTS staff training. It facilitates the development of educational products for Combatant Command trauma system. The group also coordinates and manages continuing education opportunities and performance improvement courses.

Performance Improvement (PI): This branch coordinates the PI activities across the spectrum of trauma care. It helps develop PI course content and training, and resolve trauma system patient care issues.

Military Orthopaedic Trauma Registry (MOTR): This team manages the MOTR registry which houses trauma care information about Warriors from all Services who sustain extremity injuries. MOTR seeks to improve functional outcomes of combat casualties by using a systematic approach to determine the acute and long term outcomes of all battlefield injuries, improvement in treatment, and the logistical implications.

FACT SHEET

59 MDW Center for Advanced Molecular Detection (59MDW/ST CAMD)

MISSION: As part of the Office of the Chief Scientist, the overall mission of CAMD is to support the military's biomedical research – basic, translational, applied, and clinical. To that end, CAMD has three major endeavors under way: **One**, long-term pathogen surveillance to assess the agents' prevalence and persistence in the military community. **Two**, genetics and genomics of various diseases that are of interest to the military, and the underlying cellular and molecular mechanisms for such conditions. **Three**, adult stem cell research aimed at assessing and utilizing stem cell potential for regenerative medicine and aberrant conditions that are of relevance to the military.

Goals:

- Develop, evaluate, and implement techniques to identify pathogens that can incapacitate or otherwise hinder the military personnel performance
- Conduct urgent, timely testing and reporting to authorities for precise situational awareness
- Conduct genetics and genomics research aimed at discerning association of genetic variations with diseases of interest to the military
- Conduct cellular and molecular biological research to elucidate the mechanisms by which relevant genetic variations may cause disease
- Coordinate research activities with other Department of Defense and government facilities
- In collaboration with others, conduct translational and clinical research
- Maintain repositories of samples

Active Collaborations:

- San Antonio Military Medical Center (SAMMC), San Antonio, TX
- NavyHealth Research Center, San Diego, California
- USAF School of Aerospace Medicine, Wright-Patterson AFB, Ohio
- Pacific Northwest National Laboratory, Department of Energy, Richland, Washington
- The University of Texas Health Center, San Antonio, TX
- The University of Akron, Akron, OH
- Biomeme, Inc., Philadelphia, PA

Summary:

- CAMD is the only Air Force laboratory that conducts pathogen surveillance of military significance and urgency in large numbers of military personnel and their dependents.
- To make its mission more effective, CAMD develops and evaluates new detection and analytical methods and equipment, as well as their reliability for transition to the field.
- CAMD conducts biomedical research, and also supports other military investigators' research. The current focus areas include disease genetics, genomics, and adult stem cells.

FACT SHEET

Center for the Intrepid

MISSION: The threefold mission of the Center for the Intrepid (CFI) is to provide rehabilitation for OIF/OEF casualties who have sustained amputation, burns, or functional limb loss, to provide education to DoD and Department of Veteran's Affairs professionals on cutting edge rehabilitation modalities, and to promote research in the fields of Orthopaedics, prosthetics and physical/occupational rehabilitation. The staff and equipment for the building was selected to provide the full spectrum of amputee rehabilitation as well as the advanced outpatient rehabilitation for burn victims and limb salvage patients with residual functional loss.

Vision: Through the collaboration of a multi-disciplinary team, we will provide state-of-the-art amputee care, assisting our patients as they return to the highest levels of physical, psychological and emotional function.

History: In the spring of 2005, Arnold Fisher and the Intrepid Fallen Heroes board of directors, proffered a rehabilitation facility. Secretary of the Army Harvey accepted the proffer and \$50-million from the Intrepid Fallen Heroes fund; donations raised entirely from over 600,000 generous, Americans. Ground was broken for the four story, 65,000 square foot outpatient rehabilitation facility which includes a clinical space, military performance and gait labs, a computer assisted rehabilitation environment, a pool, indoor running track, a two-story climbing wall, and prosthetic center. There are two 21 handicap accessible suite Fisher Houses available as of 22 September 2005; a ribbon cutting for the CFI and Fisher Houses—29 January 2007—and patient care beginning in the facility on 15 February 2007.

The CFI is a world-class physical rehabilitation facility focused on medical and rehabilitative care of wounded warriors and veterans, injured in service to America, many of whom have suffered limb-loss. Its premier facilities incorporate the best technology and techniques anywhere in the world and are beyond state-of-the-art.

The CFI will provide amputees and those with severe extremity injuries the best opportunity to regain their ability to live and work productively. In addition to serving as a premier rehabilitation center, the CFI is actively involved in clinical research.

Cost: The \$50-million CFI was built entirely from private funds generously donated by more than 600,000 Americans through the Intrepid Fallen Heroes fund.

Ongoing Fundraising: Although sufficient funding has been received for the construction costs, the Intrepid Fallen Heroes Fund is accepting donations to provide additional services to the patients who will be treated in the CFI and their families. These services may include facilities for patients' children, additional medical equipment and supplies, medical research to improve the care of patients, and other areas. One hundred percent of the contributions will continue to go to these services, with nothing taken out for the Fund's administrative costs.

Eligibility: Wounded warriors and veterans who were injured in the current Global War on Terrorism will be the initial beneficiaries of the facility. The CFI serves traumatic amputee patients, burn patients requiring advanced rehabilitation, and service members undergoing limb salvage techniques. Eligible patients are evaluated by a health care team to determine if they have the potential to benefit from the advanced rehabilitation offered, prior to being cared for at the CFI. Access to the facility will be based upon the space available to provide the care in a safe environment.

Reasons for Construction: To date, more than 23,000 service members have been wounded in operations in Afghanistan and Iraq. Those who suffer injuries so severe that they require extensive medical care, years of treatment and rehabilitation, are medically discharged from the armed forces. Some are treated at San Antonio Military Medical Center, Walter Reed National Military Medical Center. Their future quality of life, their ability to care for themselves and provide for their families, and their very survival depends on the treatment, rehabilitation and advanced training skills they receive following their injury.

Reason the Center was built with Private Funds: The Army currently provides superb medical and rehabilitative care for wounded warriors and will continue to do so. The Army is extremely grateful that a private, non-profit association is partnering with the Army and other Services to provide the best possible venue anywhere in the world for our wounded warriors. These wounded military members, injured in service to America, are top-notch athletes who deserve a facility that is the best in the world.

Medical Direction: The medical care carried out in the CFI is under the direction of the chairman of the Department of Orthopedics and Rehabilitation at Brooke Army Medical Center. Physiatrists work closely with the orthopedic surgeons and other physicians to coordinate all care.

Military Performance Lab: The Military Performance Lab seeks to analyze human motion, with particular emphasis on amputee gait (walking). The information collected in the military performance lab is ultimately used to help physicians, physical therapists, and prosthetics' adjust their treatment plans and improve patient function.

Computer Assisted Rehabilitation Environment (CAREN): Is a 21-foot dome with a 300-degree screen upon which a variety of "virtual realities" may be displayed. This simulator is the first of its kind and holds much promise for the rehabilitation of the patients. The CAREN is central to the research mission of the center.

Gait Lab:

- Up to 24 cameras use infrared light to track the position of reflective markers placed on a patient's body. Joint angles are calculated and analyzed.
- Force plates in the floor, parallel bars and treadmill measure ground reaction forces in three directions. Using these factors, the torque that muscles or prosthetic components are producing can be determined.
- Electromyography (EMG) is used to assess the electrical activity that is given off during muscular contraction. The EMG system can detect both the timing and intensity of muscular contractions.

Occupational Therapy: Occupational Therapy (OT) focuses on restoring health and function following injury or illness. Treatment activities are designed so that patients can successfully perform occupational tasks and Activities of Daily Living (ADL) like bathing, dressing, shopping, cooking, writing, performing household chores and everything needed to function on a day-to-day basis. Therapists and technicians provide:

- Evaluation and treatment for conditions including amputation, fracture, nerve injury and soft tissue injury.
- Activities to regain range of motion, increase muscle strength, decrease pain, and facilitate their ability to perform functional tasks and to reach their maximum potential and independence.

Activities of Daily Living Apartment: The purpose of the ADL apartment is to provide patients a real-world environment in which to practice every-day skills. OT uses this apartment to evaluate and treat patients ensuring that patients are both physically and/or mentally capable of safely performing specific activities of daily living. The apartment has:

- A computer workstation equipped with state-of-the-art voice recognition software, compact keyboards and a height adjustable desktop
- A fully equipped kitchen and bathroom
- A comfortable living room

Firearms Training Simulator (FATS): This state-of-the-art system simulates the firing of different weapons in a host of settings. Using the system, patients practice different firing techniques and may qualify with weapons systems common to the military.

Community Re-Integration: The OT staff also coordinates a community re-integration program for the amputee patients. This program includes a wide variety of experiences outside the clinic setting. Activities such as horseback riding, paint-ball, archery, kayaking and golf allow the patients to be challenged and have fun at the same time.

Physical Therapy (PT): PT provides evaluation, diagnosis, treatment and rehabilitation for patients who have sustained trauma and/or illness. For the amputee patient, the PT team utilizes multiple interventions focusing on patients' abilities and interests, not their disabilities.

- Amputation awareness and residual limb care while still an inpatient
- Wheelchair mobility and crutch training
- Strengthening activities
- Pre-prosthetic training working on dynamic balance, proprioception and endurance
- Residual limb care, fit awareness and gait training on a variety of surfaces
- An adaptive sports program including a multi-phased running program, swimming, snow skiing, water skiing, track and field, basketball, volleyball, fencing, archery, shooting, golf, kayaking and scuba diving.

Specialized Equipment: The third floor has a Treadwall and 21-foot climbing tower with auto-relay to promote strengthening, agility and aerobic conditioning.

In the natatorium there is a six-lane pool for pre-running activities, kayaking, water basketball, volleyball, and general swimming. The Flowrider®, a unique indoor activity is adjacent to the pool and used to improve balance, coordination, strength, motivation, and confidence.

Case Management: A full-time case manager is assigned to each patient in the CFI. These professionals work closely with the patients, their families and the entire CFI staff to:

- Coordinate the development of a customized, multidisciplinary team plan of care
- Monitor the plan of care to report any problems to the appropriate team member(s)
- Seek solutions to improve the delivery of care and patient outcomes
- Identify and assist with all needs of the patient and the family
- Function as the initial point of contact for multiple referrals utilized to augment care at SAMMC

Behavioral Medicine: The ultimate goal for the CFI Behavioral Medicine Service is to enable patients to maximize their potential for emotional, mental, spiritual and physical recovery.

- Comprehensive psychiatric support services to amputees and their families from inpatient through convalescence and rehabilitation
- Individual therapy, support group meetings, medication management, family support group, and cognitive assessment
- Treatment facilitation for all behavioral health needs

Prosthetics: The prosthesis's and technicians in the CFI utilize a team approach to provide state-of-the-art onsite fabrication of artificial limbs. Standard production methods are augmented by:

- Computer assisted technology for design, milling, and production of prosthetic devices
- Wireless technology for remote adjustment of upper and lower extremity prostheses
- Design and fabrication of unique specialty limbs for sports and other activities
- High-tech materials in combinations of acrylic resins, carbon fiber composites and titanium

FACT SHEET

59 MDW Clinical Research Division

The 59th Clinical Research Division (59 CRD), 59 MDW Chief Scientist's Office, is located at Wilford Hall Ambulatory Surgical Center, Joint Base San Antonio (JBSA) Lackland, TX. The 59 CRD is the largest and busiest Clinical Investigation Program (CIP), supporting more research and training than all other CIPs in the AFMS combined. It consists of a free-standing facility and vivarium. The CRD supports operational training requirements for Graduate Health and Science Education (GHSE) programs, 59th Medical Wing and San Antonio Military Medical Center (SAMMC) healthcare providers to develop the Military Health Service Force as well as clinical investigations for the advancement of medical science and application to military and nonmilitary patient care. The CRD provides centralized administrative, scientific and regulatory oversight and guidance to the 59 MDW and over 67 other Air Force, Army, and Navy institutions, universities and civilian research organizations in the development and performance of institutional, national and international biomedical research. Available support includes protocol development, research design, biostatistics consultation, IRB oversight, laboratory analysis, animal surgical services, veterinary care and IACUC oversight.

The CRD supports many areas of clinical investigation with special concentrations in:

- Vascular Injury Management Medical Toxicology
- Emergency Medicine
- Regenerative Medicine
- Stem Cell Research
- Dental Post Graduate Studies
- Personalized Medicine (Genomics)

The CRD provides unique medical readiness training (70 Training courses with 248 Surgical cases; Over 1500 students trained in FY17):

- General Surgical Skills Training
- Extracorporeal Membrane Oxygenation (ECMO) Training
- Pararescue Technique Training
- Emergency Skills Training
- Emergency War Surgery Course
- Oral Maxillofacial Training
- Endovascular Skills Training and Resuscitative Surgery (ESTARS)
- Urological Surgical Skills Training
- Plastic Surgical Microvascular Surgery Training
- MicroSurgical Training for Ophthalmology Residents
- Divinci Surgical Robot Training

The 59 CRD is Divided into Three Branches:

The Support Branch ensures 59 MDW and other supported sites maintain all appropriate federal and DoD assurances to perform human subject research, appropriate inter-institutional agreements for collaborative research locally, nationally as well as internationally and assists visiting investigators with coverage by the 59 MDW assurances, when appropriate. The Support Branch supports the Institutional Review Board (IRB) and Institutional Animal Care and Use Committee (IACUC) which provide IRB regulatory oversight, outreach, and training while ensuring regulatory compliance for all 59 MDW human research and research studies currently active in over 67 other institutions, including Air Force, Army, and Navy Medical Treatment Facilities (MTFs), universities and civilian research organizations. IACUC regulatory oversight ensures regulatory compliance for all animal studies conducted by the 59 MDW. The Support Branch also assists investigators with protocol development, approval of clinical investigations, biostatistics, and dissemination of findings.

In FY17, the Support Branch managed 296 clinical studies conducted throughout the AFMS:

- 232 of the clinical investigation protocols were human and human exempt studies
- 49 animal clinical investigation and training protocols were conducted in FY13
- 129 Bench Studies (lab studies, material testing, etc.)
- Residents served as Principal or Associate Investigators for the majority of these studies

59 MDW IRB has agreements in place to serve as primary IRB for 67 other institutions, including Air Force, Army, and Navy MTFs, universities and civilian research organizations.

The Operations Branch provides comprehensive animal care, surgical support and animal pathology services:

- Three fully functioning operating suites, including microsurgical capability
- One animal hyperbaric/hypobaric chamber for clinical investigation such as altitude sickness, hyperbaric treatment of radiation injury, and wound healing
- Two Instron Materials Testers for various applications to determine fatigue, impact, and/or resistance of materials and tissues
- Radiology and imaging capabilities, including ultrasound, digital film, and fluoroscopy
- 25,000 square foot vivarium which houses up to seven species of animals
- Approximately 31,000 square feet of paddock area for up to 250 animals
- A fully equipped necropsy room (area for performing complete animal post-mortems)
- Animal histopathology laboratory for preparing slides of collected samples for examination by a veterinary pathologist including gross and microscopic pathology analyses of tissues, lesions, bones, teeth, and metal prostheses
- DiVinci Robotic Surgery System – training program to certify surgeons to use the system in actual patient surgery
- Over \$21M in medical equipment available to support clinical investigations

The Laboratory Branch provides human and animal laboratory support in five major areas:

- Chemistry and Toxicology – Clinical Chemistry, Spectrometry, High Performance Liquid Chromatography, state-of-the-art Gas Chromatographic-Mass Spectrometric (GS-MS) and Liquid Chromatographic Mass Spectrometric (LC/MS/MS) instruments for the analysis of drugs, drug metabolites, hormones, enzyme inhibitors; identification of biomarkers for disease prediction, treatment monitoring, and other small molecular weight compounds
- Hematology – CBC, platelet, reticulocyte and differential, coagulation testing (clottable, chromogenic, and latex immunoassay), platelet function, and enzyme immunoassays
- Molecular Biology – Real-time polymerase chain reaction (PCR) and multiple sequencing techniques to include Pyrosequencing, Sanger sequencing and Next generation sequencing for nucleic acid detection, typing, and gene expression, genotyping and snip analysis. Full Human Genome Sequencing for Exome, Transcriptome, Multiplex-Targeted, and Microbiome Studies.
- Cell Biology and Immunology – Multicolor flow cytometry to quantify and measure specific cells, cell culture capability to include proliferation and viability studies, single and multiplex biomarker detection and quantification with enzyme-linked immunosorbent assay (ELISA), and Blood Banking
- Microbiology – Aerobic and anaerobic culture for epidemiology, disinfectant, proteomic, and medical readiness studies, Microscopy to include General, Fluorescent and Scanning Electron Microscope with 3D Dimensional capability

Detailed information about the 59th Clinical Investigations Division can be found on the Knowledge Exchange at the following URL:

<https://kx2.afms.mil/kj/kx8/ClinicalResearchJBSALackland/Pages/home.aspx>

And, detailed information on 59MDW/ST can be found at the following new URL:

<https://kx.afms.mil/kj/kx8/59MDWScienceAndTechnology/Pages/home.aspx>

FACT SHEET

Diabetes Center of Excellence (DCOE)

MISSION: Promote excellent diabetes care and prevention across the Military Health System (MHS). The mission is three fold: Clinical Practice Excellence, Outreach and Training, and Translational Research.

VISION: The DCOE will be the diabetes resource for Air Force Medical Operations Agency (AFMOA) disease management and prevention efforts.

Current State:

- Diabetes is a worsening epidemic confronting our medical system
- >58K AF Tricare beneficiaries have diabetes
- >120K AF Tricare beneficiaries have prediabetes
- Diabetes care and education throughout the AFMS is fragmented and non-standardized
- Bulk of diabetes encounters are performed at the primary care level
- Diabetes standards are complex and updated annually

Leadership of AFMS Diabetes Management Efforts:

- Clinical Subject-Matter Expert executing AFMS strategic diabetes care plans
- Standards of care policy guidance
- Partnership with AFMOA to align with health promotion and clinical advocacy programs
- Development and maintenance of “how to” guides for MTFs

DCOE Training Initiatives:

- Three day provider Continuing Medical Education (CME) course offered in-resident or by VTC twice yearly (20 contact hours)
- One hour monthly Diabetes ECHO (Extension for Community Healthcare Outcome) program for education and case discussion
- One hour monthly Diabetes Prevention ECHO program for education and case discussion
- One-half hour monthly nurse focused Diabetes Webinar
- Comprehensive Web-site with tools, education, and training available to any DoD facility
- Training opportunities at external MTFs Nurses/Dietitians/Medical Techs shadowing opportunities
- Expanded GME opportunities (Internal Medicine residents, Endocrine fellows, and Pharmacists)
- Group Lifestyle Balance (GLB) diabetes prevention program offered to patients and training to providers
- Diabetes Self-Management Education via TeleHealth (Patients)

Consultative Service:

- DCOE expertise available to MTFs for specific patient issues – Direct referrals, t-cons, and e-mails
- Advocacy Role – Community interventions and policy changes

FACT SHEET

Air Force En Route Care Research Center (59MDW/ST ECRC)

MISSION: As part of the Chief Scientist Office, the Air Force En Route Care Research Center provides comprehensive, far forward research in order to enhance patient stabilization, preparation for movement, staging, and in-flight/in-transit care. End state is focused research conducted that will advance knowledge and treatment of injury and disease.

VISION: The vision of this charter is two-fold.

- Facilitate research and solution development for patient movement capability gaps from point of injury to point of final definitive care, that is, across the continuum of care.
- Provide a solid foundation for the 59 MDW ECRC Concepts of Operations at the United States Army Institute of Surgical Research within the Joint Center of Excellence for Battlefield Health and Trauma.

BACKGROUND:

- ECRC Charter established Sept 2011, and first full-time director assigned Jul 2013
- The ECRC is part of the Air Force Combat Casualty Care Center with the Joint Battlefield Health and Trauma (BHT) Institute located at Ft. Sam Houston, TX
- The en route care continuum encompasses a broad spectrum of transport environments including both rotary and fixed wing patient moves.
- ECRC serves as the focal point for studying clinical knowledge gaps related to en route continuum of care to include Medical Evacuation (MEDEVAC), Aeromedical Evacuation, Critical Care Air Transport Team (CCATT), and Burn Flight Team (BFT).
- All En Route Care human and animal research protocols are managed thru the oversight of the U.S. Army Institute of Surgical Research (USAISR), Brooke Army Medical Center (BAMC) and 59 MDW/ST Institutional Review Board and Institutional Animal Care and Use Committee's.
- From Fiscal Years (FY) 2010 and 2015, 25 human research protocols, along with 15 animal research protocols were conducted and are currently ongoing. Areas of research: spinal fractures, blood transfusion, sepsis, acute coronary syndrome, burn, acute and chronic pain, traumatic brain injury, lifesaving interventions, hemorrhagic shock and compartment syndrome.
- Multiple Joint Collaborations with USAISR Burn Center, Critical Care Monitoring Task Area, Tactical Combat Casualty Care Task Area, USAISR Pain Task Area, Joint Trauma Center of Excellence, USAF CCATT Pilot Unit, and SAMMC Department of Emergency Medicine.
- Future research areas include En route Care Health Care Outcomes: Evidence based care for TCCET/MERT/CCATT/TACEVAC/MEDEVAC, Hospital Based Clinical Trials: Resuscitation devices, ultrasound, and analgesia. Preclinical Studies: Pre-hospital resuscitation, serum marker for hemorrhage shock. Devices: Monitoring, documentation, decision support.
- Additionally, Mentorship of Residents/Fellow from AF and Joint Services have provided support as Associate Investigator's on several research protocols.
- Over 15 Papers Published to nationally recognize medical journals; and 75 Oral and Posters presentations to National and International audiences.

FACT SHEET

Adult Extracorporeal Life Support (ECLS) Program

MISSION: To provide comprehensive ECLS support to eligible adult patients including combat casualties with respiratory, cardiopulmonary, and multi-organ failure and to serve as the hub for Department of Defense (DoD) Adult ECLS care and research.

BACKGROUND:

- ECLS utilizes modified heart-lung bypass equipment to provide temporary (days to weeks) heart and lung function during periods of severe cardiopulmonary failure
- The San Antonio Military Medical Center (SAMMC) Adult ECLS program received pilot funding to explore the need for this level of care for adult patients and combat casualties in 2010
- Since April 2011, candidate patients referred to the SAMMC Adult ECLS program have been prospectively tracked as part of an Institutional Review Board approved data collection protocol
- In September 2012, the SAMMC Adult ECLS program managed its first patient and has since achieved numerous remarkable milestones.
 - Roll-out of a long-range transport team is currently underway
 - Sustainment requires a clear path for designee care
- Includes Extra-Corporeal Membrane Oxygenation (ECMO) to provide partial heart-lung bypass ECMO to eligible infants and children suffering from severe cardiopulmonary failure. An Adult ECMO Center was formally stood-up in 2013, the only center in DoD.

SAMMC Adult ECLS Program:

- To date 17 patients have been supported with ECLS by our program
- First adult fixed wing ECLS transport in CONUS, January 2013
- First adult trans-Atlantic ECLS transport in the DoD, July 2013
- First adult ECMO bridge to lung transplant, October 2013
- Referring Intensive Care Units (ICUs) include the Burn ICU, the Medical ICU, Surgical ICU, and Trauma ICU and numerous civilian institutions
- Of the 17 patients, 8 have undergone transport
 - Medical Director, Nurse Program Manager in place
 - ECLS physicians, Nurse ECLS specialists trained
 - Credentialing and certification process in place
 - Equipment and supplies purchased
 - Standard Operating Procedures developed and hospital-wide policy approved

Long-Term Vision: For SAMMC to be the DoD's Adult ECLS Clinical and Research Hub.

- Provide global ECLS Lung and Heart Rescue Transport
- Provide Subject Matter Expert and transport support to the Landstuhl Regional Medical Center (LRMC) Lung Team with an ECLS Unit Type Code
- Provide SME and transport support to the Tripler Army Medical Center ECLS team
- Build on the close working relationship between the USAF and the US Army in the clinical care of combat casualties and other patients with severe lung failure. Key milestones in this relationship were:
 - Decades of leadership by Wilford Hall Medical Center in the aeromedical transport of neonatal ECMO patients
 - The longstanding ECLS animal research program at ISR
 - The creation of an Acute Lung Rescue Team (ALeRT) at Landstuhl Regional Medical Center in 2005, based on the successful Army Burn Flight Team and USAF CCAT Team models (R. Fang 2011)
 - Performance of the first combat-zone ECMO insertion and transport by the ALeRT in October 2010
 - Creation of an adult ECLS program by Lt Col Jeremy Cannon within the ISR Burn Center in 2012
- Collaborate with other clinical and research sites in the DoD
 - Center for Sustainment of Trauma and Readiness Skills (CSTARS) – Baltimore
 - CSTARS Cincinnati/St. Louis
 - David Grant Medical Center

Education and Training:

- Supports graduate medical education in Trauma/Critical Care, General Surgery, Burn Surgery, Internal Medicine, Cardiology, and eventually Emergency Medicine
- Provides training for 6 staff physicians, 2 Trauma/Critical Care fellows, 2 Burn fellows, 10 Burn ICU nurses, and 4 respiratory therapists
- Provides neonatal and pediatric Extra-Corporeal Membrane Oxygenation nurse specialists opportunities for additional training
- Offers training to personnel who makes a permanent change of station to LRMC

Readiness:

- ECLS for combat casualty transport has saved multiple lives to date
- Pumpless support used in the past has been upgraded to full ECLS recently
- The LRMC Lung Team has now transported 2 patients from the Area of Responsibility to LRMC on ECLS
- Multiple additional patients have been started on ECLS after arrival at LRMC
- These patients currently receive their ECLS care at a German civilian hospital
- A Critical Care Air Transport Team or Burn Flight Team model could be used to bring these patients to SAMMC in the future

SAMMC ECMO Program Statistics 12/30/1899 Thru 12/8/2017

	Survival to Decannulation @ SAMMC	Survival to Discharge @ SAMMC	Transferred on	Survival to Decannulation Overall	Survival to Discharge Overall	Total ECMO Inpatients	Total Inpatient ECMO Runs	Days/Hours of ECMO Therapy
All	39/55 (71%)	30/52 (58%)	8	45/63 (71%)	36/60 (60%)	67	69	753.9 /18088
Respiratory Failure	37/49 (76%)	30/46 (65%)	2	39/51 (76%)	32/48 (67%)	55	56	594.9 /14274
Cardiac Failure	0/0 #Nu	0/0 #Nu	1	1/1 (100)	1/1 (100)	1	1	1 /24.48
Bridge to Transplant	0/1 (0%)	0/1 (0%)	4	2/5 (40%)	2/5 (40%)	5	5	120.2 /2882
Post Cardiotomy	3/5 (60%)	1/5 (20%)	1	4/6 (67%)	2/6 (33%)	6	7	38.6 /927.8
ECPR	0/1 (0%)	0/1 (0%)	0	0/1 (0%)	0/1 (0%)	1	1	1.8 /42.72
Transport to SAMMC	16/22 (73%)	13/21 (62%)	2	18/24 (75%)	15/23 (65%)	28	28	391.4 /9392
Total Transports	45	Active Duty	7	SECDES-Burn	15			
Ground	28	Dependent of Active Duty	8	SECDES-Trauma	10	Civilian admitted for ECMO	19	
Fixed Wing	16	Retiree	9	VA Sharing	1	Civilian patients admitted for ECMO in any category		
Rotary Wing	1	Dependent of Retiree	1	Other	1			
All Active Duty	10	SECDES-Air Force	15					

FACT SHEET

CRITICAL CARE AIR TRANSPORT TEAM

MISSION: To operate an intensive care unit in an aircraft cabin during flight – adds critical care capability to the U.S. Air Force/Coalition Forces Aeromedical Evacuation System.

BACKGROUND: The Critical Care Air Transport Team (CCATT) Unit' concept was developed by Maj Gen (Dr.) P. K. Carlton and Col Chris Farmer at the 59th Medical Wing, Lackland Air Force Base, Texas in response to Joint Vision 2010. CCATT patients have received initial stabilization, but are still critically ill; requiring evacuation from a less capable, to a more capable hospital.

DEVELOPMENT: The CCATT pilot program initiated in May 1994; and by June 1996, the CCATT was formally approved and adopted into the USAF Aeromedical Evacuation System.

- Air Mobility Command, the AES authority, assumes responsibility of teams
- 59th Medical Wing (AETC) is the designated Pilot Unit, responsible for concept of operations, allowance standard content, performance improvement, and innovations to equipment and procedures
- Developed Hurricane Rapid Response Teams to assist with Humanitarian evacuations during Hurricane Season in the United States. First in the Military Medical System.

TEAM COMPOSITION:

- CCATT is a three member team (critical care physician, critical care nurse and respiratory therapist)
- CCATT Extender Team (two critical care nurses) allowing a CCATT to manage additional patients, or serves as medical attendants for non-critical patients
- The 59th Medical Wing is tasked to provide 16 CCATT Teams
- CCATT augments an AE crew of five personnel (two flight nurses, three flight technicians) when critically ill patient(s) are transported.
 - Each team can care for three critically injured, monitored patients (or six less severely injured); with an extender team, increasing to five ventilator patients or ten less critical patients.
- CCATT medical gear is man portable and battery operated, consisting of two backpacks (47 lbs each), nine equipment and medical supply bags, and one drug case.
- Three full sets each containing, life support respirator, cardiac/physiologic monitor, computerized intravenous infusion pump, continuous suction unit and laboratory-testing device. Also included, procedure kits and supplies needed to manage patient complications. Total weight, approximately 900 lbs.
- Team Employment
 - CCATT is designed to support combat casualties being evacuated from combat
 - In OPERATION ENDURING FREEDOM (OEF) and OPERATION IRAQI FREEDOM (OIF), CCATT has participated in operations at major air bases, and deployed far forward with AE teams, frequently operating with Special Forces and Army Forces.

- CCATT operates in other settings:
 - Homeland Defense
 - 59 MDW deployed 4 CCAT Teams to McGuire AFB, New Jersey in support of the Sept 11, 2001 tragedy at the World Trade Center/Pentagon.
 - Humanitarian Assistance
 - Aircraft crash in Ecuador
 - Pipeline explosion in Ecuador
 - 747 Airplane crash in Guam
 - Mission to Antarctica to evacuate a National Science Foundation employee
 - 2005 hurricanes Katrina and Rita, CCATT evacuation of 150 patients
 - 2008 hurricanes Gustav and Ike, CCATT evacuation of 16 patients
 - 2010 CCATT Haiti earthquake support
 - 2013 Oklahoma tornadoes
 - 2017 Hurricane Irma and Harvey to Houston, Texas, Puerto Rico, and the Virgin Islands
 - Military operations other than war
 - Haiti invasion (Operation Uphold Democracy)
 - Bosnia peacekeeping operation (Operation Joint Endeavor)
 - Pullout of U.S. troops from Somalia
 - Khobar Towers bombing (Dhahran, Saudi Arabia)
 - Non-combatant evacuation from U.S. Embassy in Liberia
 - Special Operations support
 - Peacetime movement of critically ill beneficiaries of military health care system
 - Within the Continental U.S. (CONUS) and Europe from specialized care such as liver transplant and other special procedures
 - From Europe, Central America and South America to CONUS
 - Special Missions
 - Support of U.S. President travel to medically remote locations
 - Support for landing of astronauts in Soyuz escape module in Kazakhstan
 - Nation building
 - Assisting the countries of Chile, Georgia, Turkey, Columbia, Bangladesh and Mexico in developing similar programs

ADDITIONAL CCATT CONTRIBUTIONS:

- 2008 CCATT Pilot Unit develops CCATT Process Improvement Database
- 2009 Air Mobility Command mandates that all 3899L patient documentation to be sent to CCATT Pilot Unit for QI/PI by PI Nurse Consultant
- In operation OFS, OIR, OND, CCAT has participated in operations at major air bases and deployed far forward with AE teams, frequently operating with Special Forces and Army Forces
- 2015 59th MDW CCATT assisted US service member and family transport from Belgium to Galveston, TX after IED incident
- 2015 59th MDW CCATT supported POTUS visit to CUBA with Austere Surgical Team

FACT SHEET

Graduate Health and Science Education (GHSE) Platform

MISSION: The mission of the San Antonio Uniformed Services Health Education Consortium (SAUSHEC) is to conduct military Graduate Health and Science Education/Graduate Medical Education (GHSE/GME) programs in San Antonio that comply all Accreditation Council for Graduate Medical Education (ACGME) requirements, are of the highest quality, and meet the needs of the Department of Defense (DoD). SAUSHEC graduates are physician specialists who are qualified, competent and morally and ethically suited for careers in medicine and to serve in the Medical Corps of the uniformed services of the United States. They will provide medical care to DoD beneficiaries and will meet the highest standards of professional competence and efficiency.

By combining the resources of its member institutions (Brooke Army Medical Center (BAMC) and Wilford Hall Medical Center (WHMC)) into a fully integrated GME entity, SAUSHEC will provide a scholarly environment dedicated to excellence in education and health care with the most efficient and cost-effective use of DoD physical, financial and human resources. SAUSHEC is further committed to collaborating with the University of Texas Health San Antonio (UTHSA) and the Audie Murphy Veterans Administration (VA) Hospital to improve GME quality and efficiency in San Antonio.

SAUSHEC will accomplish its mission by serving as the ACGME-recognized Sponsoring Institution for all military GME programs in San Antonio. The SAUSHEC Dean will serve as the ACGME Designated Institutional Official (DIO) for all military GME programs in San Antonio.

BACKGROUND: SAUSHEC is the Sponsoring Institution recognized by the ACGME, Brooke Army Medical Center and 59th Medical Wing Commanders, and the Department of Defense for military GME and GAHE in San Antonio.

- Created in ~1996 via Memorandum of Agreement between the Army and the Air Force Surgeon Generals
- Preceded by the Joint Military Command in 1987 with two programs integrated (Urology and Emergency Medicine)
- Primary clinical sites are San Antonio Military Medical Center (SAMMC) and Wilford Hall Ambulatory Surgical Center (WHASC)
- Major participating training sites include the University of Texas Health San Antonio (UTHSA), Carl R. Darnall Army Medical Center, Audie Murphy South Texas Veterans Health Care System, and Children's Hospital of San Antonio

- Hosts 37 Graduate Medical Education programs (17 residencies, 20 fellowships)
- Hosts 22 Graduate Allied Health Residency programs (13 residencies, 9 fellowships)
- Trains approximately 700 military residents per year (60% Air Force, 40% Army)
- Supports two GME programs sponsored by UTHSA (Psychiatry and Nephrology)
- SAUSHEC GME programs outperform most civilian programs in national accreditation standards, graduate board pass rates, and in-service test scores

FACT SHEET

Hearing Center of Excellence (HCE)

MISSION: To heighten readiness and to continuously improve the health and quality of life for members of the Armed Forces and Veterans through advocacy and leadership in the development of initiatives focused on the prevention, diagnosis, mitigation, treatment, rehabilitation, and research of hearing loss and auditory system injuries.

VISION: To fulfill America's commitment to all who support and defend our Nation by serving as the nation's premier center for promoting excellence in the prevention, diagnosis, mitigation, treatment and rehabilitation of hearing loss and auditory system injuries for our Military Service Members and our Veterans.

The HCE was legislated by Congress in the fiscal year 2009 National Defense Authorization Act. And directed (to the maximum extent practicable) to partner with the Department of Veterans Affairs (DVA), institutions of higher education, and other appropriate public and private entities. The HCE's primary responsibilities include:

- Developing a data registry to track hearing loss and auditory system injuries across the Armed Forces and sharing the data in the registry with the DVA
- Encouraging and facilitating the conduct of research
- Developing best practices and clinical education
- Ensuring coordination of rehabilitation benefits and services offered by the DVA to former Service Members.
- In October 2009, the Air Force Medical Service was officially designated as the Department of Defense lead component for the HCE.
- The HCE was established to develop strategies to address tinnitus and hearing loss, which are the most prevalent service-connected disabilities.
- With an estimated \$2 billion a year spent by the DVA for 1.2 million veterans with tinnitus and hearing loss, establishing a center focused on auditory issues has the potential to reduce, not only the disability cost of hearing loss, but the degree of impairment suffered by Service Members.

FACT SHEET

Hyperbaric Medicine

MISSION: The Wilford Hall Ambulatory Surgical Center (WHASC) Hyperbaric Medicine Flight is one of only two clinical hyperbaric chambers in the AFMS. The WHASC hyperbaric medicine flight opened on March 21, 2008, following the closure of Hyperbaric Medicine at Brooks City-Base, Texas. Hyperbaric chambers are used to deliver oxygen at high pressure. Under such conditions, oxygen behaves as a drug which is FDA approved to treat 14 indications.

BACKGROUND: The Air Force has used hyperbaric oxygen therapy for more than 40 years. Originally, the therapy was used to treat aviators and aircrew trainees who suffered decompression sickness.

- Hyperbaric oxygen can be used to treat several life threatening conditions, such as crush injuries, carbon oxide poisoning, burns, non-healing ulcers, compromised skin grafts, radiation soft tissue damage and chronic infections.
- Hyperbaric chamber treatment promotes faster healing of hard-to-heal wounds by exposing the body to pure oxygen inside a pressurized chamber. With higher pressure, more oxygen is delivered and increased oxygenation of the blood and capillary bed density, leading to faster healing.
- In March, 2008, WHASC purchased two new hyperbaric chambers, and began hyperbaric oxygen therapy in the hospital; and staffed the department with board-certified hyperbaric medicine physicians; fellows, nurses, technologists, and maintenance technicians. Each of which trained in the administration of hyperbaric oxygen therapy.
- September 2015 marked the construction efforts of a new state-of-the-art Hyperbaric Medicine facility at SAMMC. The chambers at WHASC will be transferred to the new facility. Once located in a hospital setting, the new facility will be able to treat a great number of patients, especially those requiring hospitalization.
- June 2017, Joint Base San Antonio, Lackland Texas, the 59th Medical Wing opened the doors to a new state-of-the-art facility near the San Antonio Military Medical center on JBSA Fort Sam Houston to expand the wing's capacity to provide hyperbaric medicine and wound care.
- There is much pride in the new facility and the partnership with the Army at MHS's most productive inpatient facility. The specialized equipment affords critical care capability inside the chamber. In essence, the chamber becomes an intensive care unit room under pressure.

NEW FACILITY: By moving operations adjacent to SAMMC, the only level one trauma center in the DoD, the 59th MDW can work more closely with the Army and Navy to deliver care to more patients. The 13,281 square foot, \$13.6 million facility can treat the full spectrum of hyperbaric medicine including advanced wound care. The facility is a comfortable, relaxing setting that looks like a hospital room instead of a cylinder-like chamber. In the rectangle, six-person multiplace chamber and single patient or monoplace chambers, doctors tailor all treatment plans to meet patient needs.

FACT SHEET

Joint Warfighter Refractive Surgery Center of Excellence

The Joint Warfighter Refractive Surgery Center (JWRSC) located at Wilford Hall Ambulatory Surgical Center (WHASC), Joint Base San Antonio—Lackland, TX is currently the largest and most productive of the Air Force's seven refractive surgery centers averaging over 2700 refractive surgery procedures per year. This joint Air Force/Army center is equipped with the latest in refractive surgery technology and employs a staff of six fellowship trained corneal surgeons supported by twenty-two highly skilled optometrists, technicians, and administrative personnel.

Although officially established as the JWRSC in 2007, the facility has been a pioneer in military laser eye surgery since the first Photorefractive Keratectomy (PRK) procedure was performed by an Air Force Ophthalmologist here in 1999. Since then more than 48,164 active duty personnel have undergone laser vision correction at the facility, optimizing their visual performance in the combat environment by reducing their dependence on glasses and contact lenses.

MISSION: The mission of the JWRSC is three-fold—**Readiness, Education and Research.**

VISION: Provide the Best Refractive Technology and Outcomes to Give our Most Important Weapons System--Our People--the Combat-Edge in Vision!

READINESS: Maximizing the combat readiness and mission effectiveness of our airman, soldiers and sailors through vision enhancement is our most critical and important mission.

- Provides State-of-the-Art Refractive Surgery to Active-Duty members from all three military services and the US Coast Guard
- The highest-volume Refractive Surgery Center in the Air Force
- Has performed 40% of all USAF surgeries to date with no sentinel events
- The referral center for all complicated refractive cases
- Provides Surgical Services to Air Force, Army and Navy medical facilities throughout the southern and mid-western regions of the country
- One of only two Department of Defense (DoD) Joint Refractive Surgery Centers

EDUCATION: WHASC has the only Air Force Ophthalmology Residency which is also the DoD's largest Ophthalmology Residency Program with an average enrollment of eighteen Air Force and Army residents.

- The JWRSC is the only Air Force Center with staff providers certified as Physician Trainers for Laser Refractive Surgery.
 - Residents as well as ophthalmologists from the field, routinely receive hands-on training in refractive surgery procedures at the JWRSC.

- The JWRSC has Certification Authority for Air Force Optometrists for co-management of refractive surgery patients.
- The JWRSC staff conducts the only US Army Optometry Co-Management Course.
- A training agreement with the University of Texas Health Center allows the JWRSC staff to train civilian Ophthalmology residents in refractive surgery.
- A Teaching Affiliation Agreement (TAA) is currently in place with two civilian universities allowing their Cornea and Refractive Surgery Fellows to gain hands-on refractive surgery training at the JWRSC.
- The JWRSC is a recognized National Center of Excellence in Refractive Eye Care.

RESEARCH: As a Graduate Medical Education (GME) teaching institution, many WHASC residents are required to do research as part of their training and the staff doctors are highly encouraged to be involved in research activities as part of the GME certification process.

- The JWRSC has a professional staff experienced with both human and animal studies
- The JWRSC is the Operational Test and Evaluation Center for all emerging Refractive Technology in the Air Force Medical Service
 - Conducted the Federal Drug Administration Trial for Wavefront-Guided PRK with Naval Medical Center San Diego
 - Conducted research on emerging technologies to enhance corneal wound healing
 - Collaborated with United States Air Force School of Aerospace Medicine and Aeromedical Consult Service for Aviation LASIK Study and Outcome tracking of Aviation and Refractive Surgery
- The center typically has more than twenty active research protocols at any one time
 - Currently collaborating with industry on clinical trials to evaluate new drugs and equipment used for refractive surgery procedures
 - Ongoing research in post-operative pain control through evaluation of pain medication options, bandage contact lens optimization, and improvement of surgical techniques
 - Ongoing research to evaluate new instruments and equipment upgrades to optimize refractive surgery outcomes
 - Ongoing research in the correction of presbyopia, phakic intraocular lenses, and other refractive procedures

Over 10 Papers and Posters presented annually at National and International Ophthalmology and Refractive Surgery Meetings

FACT SHEET

NAVAL MEDICAL RESEARCH UNIT (NAMRU) SAN ANTONIO

MISSION: Conduct medical, craniofacial, biomedical, and directed energy research, which focuses on ways to enhance the health, safety, performance, and operational readiness of Navy and Marine Corps personnel and addresses their emergent medical and oral/facial problems in routine and combat operations.

VISION: Provide innovative, translational research that optimizes Warfighter readiness and saves lives.

BACKGROUND: Naval Medical Research Unit San Antonio (NAMRU-SA) is located on the San Antonio Military Medical Center campus, Joint Base Fort Sam Houston, Texas. NAMRU-SA serves as one of the leading research and development laboratories of the U.S. Navy under the Department of Defense and is one of eight subordinate research commands in the global network of laboratories operating under the Naval Medical Research Center (NMRC), Silver Spring, Maryland.

RESEARCH DIRECTORATES AND DEPARTMENTS

Combat Casualty Care and Operational Medicine

- **Expeditionary and Trauma Medicine Department:** Expeditionary and Trauma Medicine Department conducts RDT&E focused on the protection, resuscitation, and stabilization of combat casualties at frontline points of care in the combat theater. The Trauma Medicine Group focuses on primary and pre-clinical RDT&E for the development and optimization of drug products and advanced therapies for the treatment of hemorrhagic shock. The Expeditionary Medicine Group works to identify and effectively mitigate stressors and improve survivability through the evaluation of products and agents that deliver capabilities to meet rapidly evolving expeditionary warfare requirements.
- **Cellular and Immune Based Adjuncts for Casualty Care Department:** Cellular and Immune Based Adjuncts for Casualty Care Department conducts RDT&E on stem cell and immune based therapeutics intended to improve warfighter outcomes and survival. The division of stem cell therapeutics focuses on the comparison and assessment of stem cells from different tissue sources, the assessment of protein secretomes or exosomes for preventing and reducing injury from trauma/hemorrhagic shock, and the targeted treatment of severe tissue defects in order to promote tissue repair. The division of immune based therapeutics focuses on immunomodulation to prevent and reduce tissue and organ damage resulting from trauma and hemorrhagic shock.

- **Biomedical Systems Engineering and Evaluation Department:** Biomedical Systems Engineering and Evaluation Department applies engineering principles and design concepts to develop and evaluate medical devices, treatments, and diagnostic tools used in military medicine. Core capabilities include advanced trauma mannequin systems and expertise designing human subjects' research studies to evaluate design, safety, efficacy, and human factors aspects of medical devices deployed in prehospital medicine. The department also provides broad engineering expertise for a diverse portfolio of projects within the laboratory, including design and prototype development, computational modeling, custom machining/fabrication, and software development/automation. Recent development efforts include a field-portable sterilization system, an automated electrospinning system used to generate nanofiber scaffolds for wound care, and an imaging system for assessing dental pulp vitality.

Craniofacial Health and Restorative Medicine

- **Biomaterials and Epidemiology Department:** The Biomaterials and Epidemiology Department conducts research, development, testing, and evaluation of biomaterials used in medicine and dentistry and studies the distribution of oral, dental, and craniofacial diseases and injuries occurring in Sailors and Marines. Research is directed toward analyzing trends and identifying risk factors leading to the improvement of diagnosis, treatment, and prevention of craniofacial and oral injuries and diseases that affect the health and readiness of Sailors and Marines while deployed, ashore, or in garrison.
- **Maxillofacial Injury and Disease Department:** The Maxillofacial Injury and Disease Department conducts research on the pathophysiology, microbiology, immunology, and etiology of medical and dental diseases leading to the development of novel technologies to increase the armamentarium available to clinicians for the treatment of resistant infections. Current focus areas of research include the development and use of laser-acoustic, nanoparticle, phage, and biomimetic technologies.
- **Environmental Surveillance Department:** As the lead agent for mercury abatement in Navy Dental Treatment Facilities, the Environmental Surveillance Department is responsible for the development and testing of systems and technologies that minimize the environmental impact and occupational hazards of Navy Dentistry. Focus areas include clinical service life evaluation of existing amalgam separator technology, development of a sensor system to monitor amalgam separator function, and modular amalgam separator prototypes based on proven, existing technology which can increase efficiency and reduce disposal costs.

For more information:

Naval Medical Research Unit San Antonio
 3650 Chambers Pass, Bldg. 3610, JBSA Fort Sam Houston, Texas 78234
 Website: <https://go.usa.gov/xRQHc>
 Command Video: <https://youtu.be/HocIUwKo-2A>

FACT SHEET

Tri-Services Research Laboratory (TSRL)

MISSION: Provide increased military capabilities for studying directed energy weapons effectiveness, and ways to protect service members by improving health and safety standards for safe exposures to directed energy devices. The TSRL houses Navy, Air Force and Army research programs that address the health and safety effects of exposure to a variety of stressors. The TSRL includes various laser and biological research labs and echo-free chambers, enabling the Navy, Air Force and Army to simultaneously conduct research on the biological effects of directed energy.

NAVY: The Navy Medical Research Unit – San Antonio (NAMRU-SA) conducts research to study the effects of directed energy on living systems and tissues. Directed energy sources are used extensively in the Navy and are part of the next generation of weapons and counter-weapons systems. Current research is focused on evaluating the potential bio-effects associated with these systems and aiding in establishment of exposure standards adequate to protect the health and safety of all personnel operating in and around these sources.

AIR FORCE: The 711HPW Directed Energy Bioeffects Department (711HPW/RHD) captures and quantifies the biological effects of directed energy weapons, so researchers can develop non-lethal weapons and the defensive means to protect our own service men and women from this type of weapon. The Tri Service Research Lab (711HPW, TSRL) currently supports efforts conducted by the Air Force 59MDW RESTOR regenerative and restorative medicine program. Current research focus areas which most commonly is considered the realm of stem cells, biologic and synthetic matrices, and growth factors, also represents a focus of much attention in the Air Force both in the basic science and clinical arena. Vascularized composite allotransplantation (VCA) for extremity restoration and extremity transplantation offers true restoration of form and function acutely in a manner that no other reconstructive modality can. Ischemia reperfusion injury amelioration in transplanted tissues is a focus of the RESTOR program supported by the TSRL. Current approved Institute Animal Care and Use Committee (IACUC) protocols at the TSRL will support meeting translational research requirements addressing ischemia reperfusion injury (IRI) inherent in vascularized composite allotransplantation. This research will greatly improve outcomes, limit chronic rejection and form the basis for ongoing translational research efforts.

ARMY: The Veterinary Science Department works in parallel with staff researchers to provide services, facilities, and technologies to support the diverse animal-based research requirements. The veterinary staff performs comprehensive oversight to ensure the ethical use of laboratory animal models under controlled and healthful conditions. The staff also manages the preventive medicine programs and provides preoperative and post-operative care for the research animal models. Experienced scientific and technical personnel offer consultation and assistance in the design of research protocols and in the selection of appropriate models to meet the research objectives of investigators.

FACT SHEET

Joint Inflammatory Modulation of Trauma (JiMot)

MISSION: The mission of the Joint Inflammation Modulation of Trauma (JIMoT) program is to study immune-modulatory approaches to mitigate the damaging effects of hemorrhagic shock and ischemia/reperfusion on organ function and survival.

BACKGROUND: This program evaluates existing FDA approved drugs for new indications using a pre-clinical animal model of trauma and hemorrhagic shock with the goal of making immune modulating therapy a tool for both civilian and military medical services, particularly in rural and remote settings where medical evacuation is delayed.

PURPOSE: JIMoT is focused on modulating the dysregulated immune response triggered by trauma/hemorrhage. Current strategies to treat trauma/hemorrhage are often directed towards restoring intravascular volume, disregarding the importance of modulating the immune response. JIMoT's current area of focus involves evaluating multiple therapeutic targets of the complement system. Immune modulators are practical to transport on the battlefield as they are small in size and can be quickly reconstituted. When administered in pre-hospital or intensive care phases, immune modulators can potentially increase survivability, decrease resuscitation fluid requirements, reduce coagulopathy, dampen inflammation, and exert protective effects against ischemia/reperfusion-mediated tissue damage. Research is conducted at the Tri-Service Research Laboratory and the 59 Medical Wing Clinical Research Division.

FACT SHEET

59 MDW Substance Abuse Program

MISSION: Provide background for JPC-5 on research activities for San Antonio Military Substance Abuse Research Team (SAMSART), to include basic science research, sophisticated surveillance research using medical databases, and treatments in a multicenter approach with a goal of reducing substance abuse among military members by obtaining program funding to support uninterrupted research protocols.

BACKGROUND: The Department of Defense (DoD) Office of the Army Surgeon General Pain Management Task Force (May 2010) and the Chairman of the Joint Chiefs of Staff, Admiral Mullen's report "Systems Approach to Drug Demand Reduction in the Force" support the need to better understand opioid abuse and reduce the abuse.

- 2009 DoD Health Related Behaviors Survey lists prescription opioid as the most common drug abuse, above illicit drugs. Among active duty personnel, 15% misused a prescription drug in the past month and 26% in the past 12 months – Our recent data from Texas military bases confirms this behavior with increasing abuse over the last 4 years.
- The White House 2010 National Drug Control Strategy that specifically calls out opioid abuse in the military as a national priority for which further resources must be allocated (2010 Office of National Drug Control Policy).
- Additional research is needed from an experienced joint military/civilian research group to 1) better understand opioid abuse; 2) validate treatments; and 3) understand the psychosocial factors facilitating the growth of substance abuse.
- In October 2017, a White House Memorandum on Combating the National Drug Demand and Opioid Crisis was issued. The current Working Group is looking to support further research in addressing the Opioid Crisis.

The Office of Science and Technology FY17 Policy Budget Memorandum and the Deputy Assistant Secretary of Defense, in a Memorandum to the Director of Defense Health Program (DHP), both support the National Research Action Plan for Improving Access to Mental Health Services for Veterans, Service Members, and Military Families to identify and develop effective diagnostic and treatment methodologies, and metrics with the aim of improved mental health and reduction in substance-use disorders.

DISCUSSION: San Antonio has a unique, experienced team of military (Army and Air Force, San Antonio Military Medical Center (SAMMC); civilian investigators (University of Texas Health San Antonio (UTHSA) and University of Texas San Antonio (UTSA), who conduct substance abuse research and have a large collaborative group of civilian, military and combat wounded patients to study.

- A UTHSA team member is the site PI for the National Institutes of Drug Abuse (NIDA), National Drug Abuse Treatment Clinical Trials Network (CTN), interested in fostering military collaborations. UTHSA team members have experience in using electronic medical records to manage chronic opioids use, pain/abuse and screening for markers of substance abuse.
- The UTSA Vice President for Research is interested in deepening military collaborations, tapping their expertise in many areas such as neurosciences, immunology, genomics and proteomics, and computational biology.
- SAMMC Military team members have experience and a funding record in proteomics, clinical biomarkers, suicide with overdose, pharmacokinetic and pharmacodynamics of abused prescription drugs, chronic pain and detecting concomitant opioid use, and detecting prescription drug (stimulant and opioid) abuse with novel saliva and urine testing.
- SAMSART consists of a military 59th MDW basic science toxicologist with laboratory support; an Army Warrior Resiliency Program scientist; the SAMMC Chief of Medical Toxicology; the SAMMC Chief of Pain Medicine; a 59th MDW senior epidemiologist; UTHSA NIDA supported psychologists, health services researchers, and basic scientists at UTSA.
- The SAMSART Steering Committee is comprised of USAF Scientific Advisor to the USAF Surgeon General and the 59th MDW Chief Scientist, Director of Diagnostics and Therapeutics Research, a Senior Analytical Toxicologist, UTHSA Director of Health Outcomes Research, a STRONG STAR Director, and other regional experts in research, opioid use and substance abuse.
- Toxicological analytical and pharmacokinetic work is being performed at the 59th MDW, genomic work at UTHSA, proteomic work at Pacific Northwest National Laboratories (Department of Energy), and genomics/proteomics and computational biology at UTSA.
- Patient population will be combined from three hospitals, pharmacy databases from UTHSA and SAMMC; and DoD health records (at Fort Sam Houston) are in proximity and available for use.
- Currently, there are 10 Substance Abuse projects funded (\$4.6M), with intramural partners collaborating with joint service members and the following extramural partners:
 - UTHSA – 5 funded projects
 - Penn State – 1 funded project
 - Harbor University of California at Los Angeles – 1 funded project
 - University of Colorado at Denver – 3 funded projects
- Current Studies:
 - Military survey studies to quantify prescription drug abuse on military bases and in the adjacent communities.
 - Use of Poison Center Drug Identification Exchanges as a marker of military substance abuse.
 - Detection of prescription stimulant use with saliva matrixes
 - Evaluation of urine drug testing for opioid abuse in primary care and pain clinics
 - Prescription monitoring project in military medical facilities
 - Clinical trial of novel oral analgesic to reduce opioid dependency
 - Evaluating psychological predictors as a determinant of opioid misuse in chronic low back pain

- Evaluating the neurodevelopmental consequences from cannabinoid exposure in juvenile mice and novel treatment with human adipose-derived mesenchymal stem cells. Primary care redesign to support effective management of chronic pain with opioid and reduce opioid abuse.
- Within the NIDA CTN, studies to determine whether use of sub-dissociative dose ketamine can improve pain control in patients with chronic pain syndrome presenting to the emergency department with an exacerbation of chronic pain.
- Proposed/In Development Studies:
 - Develop a novel decision aid to assist military and civilian ED patients in understanding the risks, benefits, and value trade-offs regarding the decision to initiate opioids for an acute painful condition.
 - Determine the epidemiology and ethnography of synthetic cannabinoid abuse in military communities and develop educational materials for military substance abuse providers.

Summary:

- 59 MDW/CC and SAMMC/CC supports substance abuse research
- SAWG began in 2013 with the selection of members, write up of the Task Area Plan and funding of 5 FY14 studies. The 2008 and 2011 DOD Health-Related Behaviors Survey revealed that the most commonly abused drugs are the prescription pain relievers (opioids).
- With receipt of funds and Institutional Review Board approval, hiring of staff and equipment purchases, in support of the Substance Abuse program has begun. The program allows research protocols to be completed without interruption. Resources for additional funding will be monitored and proposals will be submitted to conduct follow on studies.
- The proposed studies are clinical trial work, minimal risk studies, retrospective studies, and database analysis are low risk and involve consenting subjects for retrospective review as well as monitoring bio-fluids and evaluating proteomic change.
- The current and ongoing studies are designed to deliver early assessment, interventions and treatment tools for substance abuse and common mental health issues (e.g., anger, risky behaviors, grief, guilt, cognitive difficulties). This includes studies whose deliverables are:
 - Medications to reduce substance misuse relapse or to reverse drug intoxication
 - Evidence-based practice recommendations for behavioral and pharmaceutical approaches for intervention, prevention and treatment
 - Evidence-based recommendations for reintegration and follow-up care strategies
 - Point-of-care testing for early detection that aids in facilitating treatment strategies
- The overall goal of the Substance Abuse working group is to deliver evidence-based assessment, prevention, and treatment interventions and tools that mitigate substance abuse, including, but not limited to, prescription drug misuse and alcohol and other drug abuse.

FACT SHEET

The University of Texas Health Center at San Antonio

MISSION: The mission of The University of Texas Health Center at San Antonio is to make lives better through excellence in education, research, health care and community engagement:

- Educating a diverse student body to become excellent health care providers and scientists
- Engaging in research to understand health and disease
- Commercializing discoveries, as appropriate, to benefit the public
- Providing compassionate and culturally proficient health care
- Engaging our community to improve health
- Influencing thoughtful advances in health policy
- Educate health professionals to provide the best possible health care for San Antonio, South Texas and the state of Texas; to apply state-of-the-art treatment modalities; and to continue to seek information fundamental to the prevention, diagnosis and treatment of disease.
- Play a major regional, national and international role as a leading biomedical education and research institution in the discovery of new knowledge and the search for answers to society's health care needs.
- Be an integral part of the health care delivery system of San Antonio and South Texas, as well as an important component of the health care delivery system of Texas and the nation
- Serve as a catalyst for stimulating the life science industry in South Texas, culminating in services and technology transfer that benefit local and state economies.
- Offer continuing education programs and expertise for professional and lay communities

BACKGROUND: The Health Science Center, one of the country's leading health sciences universities, ranking high as an academic institution receiving National Institutes of Health (NIH) funding. The university's schools of medicine, nursing, dentistry, health professions and graduate biomedical sciences have produced more than 31,000 graduates. The Health Science Center's six campuses are dispersed in San Antonio and Laredo.

PURPOSE: The purpose of the Health Science Center is to provide the best in health careers education, biomedical research, patient care and community service to San Antonio and South Texas. Through undergraduate, graduate and postgraduate programs, the faculty is committed to educating health professionals who will provide excellent patient care and research that can be applied to treat and prevent disease.

Military-Focused Initiative

MILITARY HEALTH INSTITUTE MISSION: The mission of the Military Health Institute (MHI) is to improve the health of our nation's military service members, veterans and their families through collaborative education, research and health care. The MHI serves as a nexus for initiatives related to military medical needs, is a catalyst for partnering with the DoD and the VA, and builds teams to expand the body of knowledge that supports military health.

Dr. Byron C. Hepburn, Maj Gen, USAF Ret, serves as the inaugural Director of the MHI. Previously Dr. Hepburn served as Deputy Surgeon General of the Air Force, Commander of the 59th Medical Wing and inaugural Director of the San Antonio Military Health System (SAMHS).

Education:

- The MHI is an active participant in the Association of American Medical Colleges (AAMC) Joining Forces Initiative program, a commitment to ensure that all Health Science Center graduating physicians understand the needs of service members, veterans and families.
- The MHI ensures that military and veteran topics are integrated into the curricula of the Health Science Center's schools of medicine, dentistry, nursing, health professions and graduate biomedical sciences.
- The Military Health Interest Group (MHIG), comprised of students, was established under the guidance and direction of the MHI to provide mentoring to students from all schools.
- The MHI will promote academic partnering that exists in the DoD, VA and other academic institutions.

Research: The MHI supports the Health Science Center's research excellence in:

- Behavioral Health /Post-traumatic Stress Disorder (PTSD) – STRONG STAR/CAP is a national PTSD research consortium
- Traumatic Brain Injury (TBI) – prevention and treatment of battlefield and civilian injuries
- Pain Management – control acute and chronic pain without narcotics
- Substance Abuse
- Future research areas: infectious disease, sleep disorders

Clinical Care:

- UT Medicine provides exceptional care for military beneficiaries.
- MHI assists UT Medicine and the UT Nursing Clinical Enterprise to ensure their continued excellent care of military/veteran beneficiaries and their families.

Partners:

- San Antonio Military Health System (SAMHS) and South Texas Veterans Health Care System (STVHCS)
- South Texas Research Organizational Network Guiding Studies on Trauma and Resilience (STRONG STAR)
- Association of Military Surgeons of the US (AMSUS)
- Uniformed Services University of the Health Sciences (USUHS)
- University of Pittsburgh Center for Military Medicine Research

- John Hopkins Military and Veterans Health Institute
- University of Texas System institutions
- San Antonio academic and industry partners
- National and international organizations

STRONG STAR and the Consortium to Alleviate PTSD

Two research consortia based at the UT Health Science Center at San Antonio comprise the world's largest research group focused on combat-related posttraumatic stress disorder (PTSD) and related conditions.

The STRONG STAR Consortium, an acronym for the South Texas Organizational Network Guiding Studies on Trauma and Resilience, was established in 2008 with funding from the U.S. Department of Defense to develop and evaluate the most effective early interventions possible for the detection, prevention, diagnosis, and treatment of PTSD and related conditions in active duty military and recently discharged veterans. Under the leadership of the UT Health Science Center at San Antonio, it brings together the expertise of a world-class team of military, civilian, and VA institutions and investigators.

The STRONG STAR Consortium is directed by Alan Peterson, PhD, a retired U.S. Air Force psychologist who saw first-hand the trauma that members of our military have experienced during post-9/11 deployments. STRONG STAR targets deployment-related injuries such as PTSD, traumatic brain injury, insomnia, suicide risk, and substance abuse. It also strives to improve understanding of factors such as biological/genetic influences on PTSD.

STRONG STAR works closely with military collaborators to identify the most significant scientific and military-relevant research studies. It also established and continues to maintain an unprecedented clinical research infrastructure that is fully integrated into day-to-day functioning at military treatment facilities. So far, it has provided state-of-the-art clinical assessments and treatments to over 6,000 post-9/11 servicemembers.

Since its inception, STRONG STAR has added a wide array of separately funded, affiliated studies to its repertoire, all in support of its mission to heal the psychological wounds of war and enhance resilience among our post-9/11 war fighters.

In 2013, these efforts were bolstered when the group was selected, under a competitive, nationwide process, to direct the new Consortium to Alleviate PTSD, or CAP, also under the leadership of Dr. Peterson and the UT Health Science Center along with the VA's National Center for PTSD. CAP was established jointly by the DoD and VA under an executive order from President Obama, as part of the National Research Action Plan for Improving Access to Mental Health Services for Veterans, Service Members, and Military Families. CAP's research includes additional innovative treatment studies and epidemiological, biological and genetic investigations to enhance understanding of physiological causes and contributors to war-related psychological conditions. A particular charge of the CAP is the identification of biomarkers to assist in PTSD diagnosis, as well as with the development of new and improved treatment methods.

Together, STRONG STAR, CAP, and their affiliated studies feature more than 150 collaborating investigators from over 40 military, VA, and civilian institutions. This unprecedented collaboration includes highly qualified researchers and clinicians with expertise in PTSD, neuroscience, genetics, comorbid conditions, traumatic brain injury, suicide, medical trauma, and research in military settings, along with military clinicians with “boots on the ground” experience in assessing and treating PTSD. This group has established itself as the only research organization capable of conducting multiple, large-scale, randomized clinical trials with active duty military. The work involves over 40 research projects with more than \$130 million in DoD, VA, National Institutes of Health, and private funding through STRONG STAR and CAP. Findings from these investigations will guide the DoD and VA on the treatment of psychologically wounded warriors for many years.

STRONG STAR-CAP Specialized Capabilities:

- Ability to conduct military-relevant psychological health research programs involving active duty service members, veterans, and their beneficiaries within military and VA settings in South-Central Texas and nationwide.
- Expertise to tailor evidence-based civilian treatments to the needs of service members and veterans and to design clinical trials to evaluate treatment efficacy and feasibility with this population.
- Preparation and submission of research grants for peer-reviewed funding by the DoD, VA, NIH, and private funding sources.

STRONG STAR-CAP Collaborators:

- Key military collaborators include Wilford Hall Ambulatory Surgical Center, San Antonio Military Medical Center, and Joint Base San Antonio-Randolph in San Antonio, TX; Carl R. Darnall Army Medical Center, Fort Hood, TX; William Beaumont Army Medical Center, Fort Bliss, TX; Evans Army Community Hospital, Fort Carson, CO; Blanchfield Army Community Hospital, Fort Campbell, KY.
- VA collaborators include nearly 10 medical centers nationwide.
- Civilian collaborators include more than 20 partnering academic and research institutions in the U.S. and Canada.

FACT SHEET

The University of Texas at San Antonio (UTSA)

MISSION: The University of Texas at San Antonio (UTSA) is dedicated to the advancement of knowledge through research and discovery, teaching and learning, community engagement and public service. As an institution of access to excellence, UTSA embraces multicultural traditions and serves as a center for intellectual and creative resources as well as a catalyst for socioeconomic development and the commercialization of intellectual property – for Texas, the nation and the world.

VISION: To be a premier public research university, providing access to educational excellence and preparing citizen leaders for the global environment.

CORE VALUES: UTSA encourages an environment of dialogue and discovery, where integrity, excellence, inclusiveness, respect, collaboration and innovation are fostered. UTSA's core values reflect how we have pursued our plan as well as how we will fulfill our mission and realize our vision. Each value reflects rich, shared meaning:

- **Integrity:** Adhering to a standard of core values at UTSA and ensuring that one acts in a fair and ethical fashion
- **Excellence:** Commitment to delivering consistently high-quality service, teaching and research through superior performance
- **Inclusiveness:** Fostering diversity and providing access to educational and socioeconomic opportunities for all, regardless of individual backgrounds and philosophies
- **Respect:** Treating others with civility and openness, recognizing the dignity inherent in each individual
- **Collaboration:** Working with others toward common goals while valuing teamwork, participation, and commitment to public service
- **Innovation:** Encouraging ingenuity, creativity and discovery

ACADEMICS: The university offers more than 160 degree programs through its College of Architecture, Construction and Planning; College of Business; College of Education and Human Development; College of Engineering; College of Liberal and Fine Arts; College of Public Policy and College of Sciences; as well as the Honors College, University College and The Graduate School.

Research specialties include health, cybersecurity, energy, sustainability, and human and social development.

Learn more at utsa.edu or at facebook.com/utsa, twitter.com/utsa or instagram.com/utsa.

FACT SHEET

Vascular Injury and Forward Damage Control Surgery (VIFDCS)

MISSION: Investigate and translate effective strategies and means to expeditiously manage combat-inflicted injuries and maintain homeostasis, thereby limiting cellular damage and additional complications. Within this research area, there are numerous gaps in injury research models and military capabilities for effective intervention in vascular trauma and the optimization of adjuncts during resuscitation in military environments.

VISION: Enable Air Force medical personnel to employ evidence-based Clinical Practice Guidelines and validated technologies for hemorrhage control and treatment of patients with vascular injuries in Air Force expeditionary medical and aero-medical evacuation systems, while providing superior quality of care for military health system beneficiaries within the Air Force scope of operations. The VIFDCS Research Program studies, develops, demonstrates, and translates materiel and non-materiel solutions to address these gaps to enhance surgical and pharmacological interventions required to achieve improvements in mortality, limb salvage, functionality, and quality of life for traumatically injured patients.

Key Research Areas:

- Wartime extremity injuries and disruption of blood flow resulting in ischemia, as they represent the leading pattern of injury on the battlefield and common cause of chronic limb dysfunction and amputation.
- Hemorrhage within the torso commonly defined as Non-compressible vascular injury which also remains a leading cause of potentially preventable death and of amputation on the battlefield and in civilian centers.
- Novel technologies which show tremendous potential to restore a person's ability to live and work as normally as possible after a disabling vascular injury or other trauma beyond the battlefield such as the use of regenerative vascular graft and tissue scaffolds augmented with pharmacologic to maintain limb arterial vascular supply and reconstruct peripheral blood vessels in tissue auto- and allo-transplantation.
- Characterization of the relationship between eventual quality of limb and psychological recovery or well-being through the investigation of patient based outcomes following extremity vascular injury. This research will help determine the links between acute injuries, clinical management information and authentic patient-based outcomes years following injury.
- VIFDCS Task Area received sponsorship in Apr 2011 establishing a focal point for vascular injury and forward damage control research.
- The VIFDCS concept is currently part of the Air Force Combat Casualty Care Center with the Joint Battlefield Health and Trauma Institute located at Ft. Sam Houston, TX.

- VIFDCS serves as the focal point for studying vascular injury through research protocols. Developing clinical knowledge to address capability gaps related to vascular injury in forward locations.
- All VIFDCS human and animal research protocols are managed thru the oversight of the Institutional Review Board (IRB)/Battlefield Health Trauma and 59 CRD Institutional Animal Care and Use Committee's.
- The VIFDCS is currently engaged in 1 human, 3 animal and 1 training protocol. Graduate Medical Education program is supported through resident driven research. Results of ground breaking research were presented at national/international meetings, and published in nationally recognized medical journals.

FACT SHEET

59 MDW Nursing Research Division (59MDW/ST)

The Nursing Research Division at the 59th Medical Wing is one of three Air Force nursing research cells dedicated to the conduct of research and the promotion of nursing inquiry. There are three active duty doctorally prepared nurse scientists assigned to the Nursing Research Division, 59 MDW/ST. Research performed by these nurse scientists is mapped into the Wing's research portfolio based on alignment to address AFMS/MAJCOM, and Joint capability gaps.

MISSION: To conduct and promote research and translate evidence to optimize nursing practice, patient outcomes, population health, and education and training across the Military Health System.

VISION: To optimize nursing care by providing evidence in support of trusted care and high reliability organization practices to improve the health of military members and beneficiaries of the Military Health System.

KEY RESEARCH AREAS:

Clinical research studies are currently being conducted within the following foci:

- Maternal identity formation; maternal anxiety, stress and their impact on pregnancy and birth outcomes; family functioning and deployment
- Patient Centered Medical Home; Secure messaging
- Population health; Evidence Based Practice
- Psychological Resilience; Positive emotions
- Stigma/Barriers to Care
- Sexual assault/harassment
- Nurse retention; Advanced Practice Nurse transition to provider role

SCOPE AND COLLABORATIONS:

- All nursing research protocols and projects reviewed by 59MDW Institutional Review Board (IRB) conducted in congruence with AF/DoD guidance, Federal mandates/laws.
- The Nursing Research Division is currently engaged in 12 IRB approved research protocols.
- Collaborative Institutions include: University of Texas Health Center at San Antonio; University of New Mexico; University of Texas at Austin; University of Incarnate Word; TriService Nursing Research Program; Uniformed Services University of the Health Sciences; Brigham and Women's Hospital, Harvard Medical School; Wright State University; Nursing Research and Women's Health Department, Joint Base Ft. Lewis McChord, Washington; and Women's Health Department, Balboa Naval Medical Center, San Diego, California.

FACT SHEET

San Antonio Military Medical Center (SAMMC)

SAMMC is located on Fort Sam Houston in San Antonio, Texas and is the largest inpatient medical facility in the Department of Defense. It plays a critical role in patient care, graduate medical education and research, as well as taking care of wounded service members.

The hospital staff provides inpatient care in a 1.5 million-square-foot, state-of-the-art medical treatment facility with 613 beds.

As a certified Level 1 Trauma Center, SAMMC receives more than 5,700 emergency room visits each month. It is one of only 31 hospitals in the United States that holds both Level 1 Trauma certification and accreditation from the American Burn Association.

In addition, 40 beds are dedicated to the Army Institute of Surgical Research, which operates the only Department of Defense Burn Center—The Army Burn Center.

The hospital, formerly Brooke Army Medical Center, had cared for thousands of service members who were injured in Operations Iraqi Freedom and Enduring Freedom, and nearly 1,500 medical professionals have been deployed in support of those missions. Since the Global War on Terrorism began in September 2001, the Burn Team had made frequent trips to Landstuhl Army Regional Medical Center in Germany, transporting patients back to SAMMC for care.

The hospital sustains over 89 accredited educational programs to include 38 graduate medical education programs, six nursing programs with two nursing accredited programs, Emergency Medical Technician Basic certification programs, 25 allied health educational programs, 18 enlisted allied health and Practical Nurse Course medic phase II training programs along with additional programs in administration and allied health specialties.

SAMMC Services:

- 32 Operating Rooms for Inpatient and Ambulatory Surgery
- Medical, Pediatric and Surgical Subspecialty Clinics
- Primary Care
- Labor/Delivery/Recovery Unit
- Neonatal Intensive Care Unit (NICU) with ECMO (extracorporeal membrane oxygenation)
- Pediatric Intensive Care Unit (PICU)
- DOD's only Bone Marrow Transplant Unit
- Inpatient Psychiatry Unit
- State of the-art Cardiac Catheterization Lab
- DOD's only Rooftop Helipad

FACT SHEET

SAMMC – Department of Clinical Investigation

The **Mission and Goal** of the Department of Clinical Investigation (DCI) is to provide a world-class medical research environment for Trainees and staff here at Brooke Army Medical Center. We will make every effort to support your research by channeling your ideas and efforts into full-fledged medical research protocols capable of addressing the medical needs of our Army. We support you by providing a one-stop shop for all your research requirements: Consultation services in formatting and writing your research proposal; Intramural funding and facilitate requests for External funding sources both private and public; Contract management and research purchases.

The DCI facilitates and supports the entire process of research approval including research proposal preparation, submission, review, monitoring, funding and contract management of approved research, by providing program administration, education and consultation for all research activities at Brooke Army Medical Center and the three Military Facilities (Fort Hood, TX, Ft. Polk, LA and Ft. Sill, OK) and clinics covered under its Assurances.

DCI Research Service

The mission of SAMMC DCI Research Service is to promote, coordinate, support and oversee organized scientific inquiry in basic laboratory research, clinical research, and pre-clinical research using human and animal subjects at SAMMC and the Southern Regional Medical Command (SRMC). The DCI Research Service also supports graduate medical education (GME) by encouraging and supporting research that includes residents at SAMMC. The DCI Research Service staff includes physiologists, biochemists, cellular biologists, immunologists, and a veterinarian, all with research experience including designing and executing research proposals and publication of results in peer-reviewed journals. These individuals are available by appointment to aid in research guidance and support. DCI Research service can be broken down into three categories: human research, animal research, and laboratory research.

Part of the DCI's mission is to support GME. Specifically, the DCI desires to get residents involved in research. Intramural funding up to \$7500 per year may be available for research projects that involve resident participation.

FACT SHEET

SAMMC – Zachary and Elizabeth M. Fisher Bone Marrow Transplant Program

MISSION: Our goal is to empower patients and caregivers with high quality information about transplant, so they can make informed healthcare decisions.

BACKGROUND: The San Antonio Military Medical Center (SAMMC) Zachary and Elizabeth M. Fisher Bone Marrow Transplant Program is the sole DoD designated treatment facility for adult allogeneic (related donor, unrelated donor, and cord blood) and one of two DoD facilities providing autologous hematopoietic stem cell transplants. The Program provides a full spectrum of care with state-of-the-science practices and technology to all beneficiaries requiring high-dose chemotherapy in the inpatient and outpatient settings. The Program is accredited by the Foundation for the Accreditation of Cellular Therapies (FACT) which assures optimal care is provided to transplant patients from diagnosis through the recovery phase of their transplant.

HISTORY: The Program was established in 1983 and performed its first allogeneic hematopoietic stem cell transplant in 1986. Since its inception, more than 789 autologous hematopoietic stem cell transplants and 676 allogeneic hematopoietic stem cell transplants have been performed. In 2005, the Program was awarded the FACT accreditation. FACT sets standards that establish minimum performance guidelines for hematopoietic stem cell transplant programs and provides oversight to assure the standards are met.

- The Transplant Program is located in the newly constructed Consolidated Tower (COTO) of the SAMMC facility at Fort Sam Houston, Texas. Comprehensive and multidisciplinary care is provided by the Transplant Program in their 21,222 square foot space facility by a team of specially trained personnel and in concert with consultants from San Antonio Military Medical Center facilities.
- The Program has a multi-disciplinary team consisting of a clinical dietitian, medical social worker, clinical nurse specialist, transplant coordinator, fellows and residents, nurses, students, and staff physicians. Daily rounds ensure continuity of care.
- The Program is comprised of a 14 private bed inpatient unit; 12 of those rooms have positive pressure air flow and two are negative pressure. There are two nurse's stations to provide convenient and safe access to patient rooms.
- The Program's outpatient clinic offers 24/7 staffing to ensure appropriate support for those patients undergoing outpatient treatment. The clinic is comprised of three examination/isolation rooms, two procedure rooms and eight treatment stations.
- The Transplant Program is in concert with the Hematology/Oncology Program supports the Graduate Medical Education through the Hematology/Oncology Fellowship Program and the Internal Medicine Training Fellowships.

FACT SHEET

Restorative Endeavor for Service members Through Optimization of Reconstruction (RESTOR)

MISSION: Advance the science of Vascularized Composite Allotransplantation (VCA), immunomodulation, and Regenerative Medicine to optimize reconstructive potential for injured service members

VISION: Provide optimal anatomic and functional reconstructive outcomes for previously non-reconstructable complex battlefield injuries

KEY RESEARCH AREAS:

- Vascularized Composite Allo- and auto-transplant (VCA) research developing translational models for reconstructive transplantation.
- Donor Tissue Specific Immunomodulation research to obviate the need for chronic toxic immunosuppression in service members who are candidates for VCA.
- Clinical Vascularized Composite Allo- and auto- transplantation reconstructing and re-functionalizing service members with upper extremity amputations through Auto- and Allo transplantation.
- Regenerative Medicine combining biologic scaffolds, adult stem cells and growth factors to produce high quality composite replacement tissues, improve range of motion, scar compliance, and aesthetics while improving scar quality through safe and effective modalities.

Scope and Collaborations:

- All RESTOR™ animal research protocols are managed through the oversight of the 711 HPW/RHD (TSRL) and 59 CRD Institutional Animal Care and Use Committees (IACUC).
- The RESTOR™ Program is currently engaged in 12 IACUC approved animal protocols.
- Collaborative Institutions: Naval Medical Research Unit San Antonio, US Army Institute of Surgical Research, USAF 59MDW/ST, UK Ministry of Defense, UK National Health Service, Gulhane Military Medical Academy (Turkish Armed Forces), Institute for Stem Cell Biology and Regenerative Medicine (India), University of Pittsburgh, Brigham and Women's, Harvard University, McGowan Institute of Regenerative Medicine, University of Texas Health Center at San Antonio, University of Alabama-Birmingham, Southwest Research Institute, Carmell Therapeutics, Faraday Pharmaceuticals, Eckert Technologies Group, University of Texas as San Antonio, Harvard Medical School, RegenMed SA, The Geneva Foundation and Fred Hutchinson Cancer Center.

FACT SHEET

Air Force Post Graduate Dental School and Clinic

59 DENTAL GROUP: The Air Force's Flagship for Dental Care and Training in the Department of Defense, building healthier communities by delivering compassionate and personalized dental healthcare, while training premier dental specialists.

MISSION: Perfecting the patient experience through premier education, research, and technology

VISION: Building the future of dentistry... always patient focused

On June 20, 2012, the Air Force Post Graduate Dental School (AFPDS) and Clinic was dedicated on Joint Base San Antonio-Lackland, Texas. This new state-of-the-art facility is host to graduate dental residency programs which train military dentists in advanced specialties and serves as a worldwide referral center. This modern \$38 million building, the Air Force's primary location for graduate dental school, is located adjacent to Wilford Hall Ambulatory Surgical Center.

This 56,000 square foot facility is home to 4 graduate residencies and one fellowship program, including the Maxillofacial Prosthetics Fellowship program, which teaches the art of creating facial prosthetics for wounded warriors with burns or other injuries, as well as patients with cancer or birth defects. The AFPDS also provides support to an additional graduate residency program located at the nearby Dunn Dental Clinic and the Hospital Dental Dentistry Fellowship located at the San Antonio Military Medical Center. The AFPDS also houses the only stereolithography laboratory in the Air Force Medical Service, which utilizes three-dimensional digital modelling processes to fabricate prosthetics and guides for the surgical placement of implants from digital images.

The AFPDS is also home to one of the Air Force's largest dental laboratories and produces more than \$2 million in annual workload. It has over 5,000 square feet of laboratory space, 69 dental treatment rooms, and contains the most technologically advanced equipment for use in dental education programs.

The AFPDS is a branch campus of the Uniformed Services University of the Health Sciences (USUHS) and Air Force, Army, Navy and Canadian dental residents receive training and complete research requirements to earn an MS in Oral Biology degree from the USUHS. Advanced dental research is also completed as part of other AFPDS residency programs due to affiliations with the University of Texas Health Center- San Antonio. Dental Materials research is also supported by the Air Force Dental Evaluation and Consultative Service, which operates a \$6 million dollar laboratory, co-located with the Battlefield Health and Trauma Institute of Surgical Research at Ft. Sam Houston, TX.

FACT SHEET

Air Force Dental Evaluation and Consultation Service (DECS)

MISSION: The USAF Dental Evaluation & Consultation Service (DECS) was established as the Dental Investigation Service (DIS) on 1 October 1976 by Air Force Regulation 162-7 and was charged to provide investigative guidance and assistance for all USAF dental personnel. DECS today provides clinical, laboratory, and consultative services for dental equipment, dental materials, dental facilities, infection control, occupational health and safety for dental personnel and patient safety. DECS and its \$6 million laboratory are located within the Battlefield Health and Trauma Institute of Surgical Research at Fort Sam Houston in San Antonio, TX. DECS moved to Fort Sam Houston as part of the Base Realignment and Closure initiative of 2005 and is co-located with the Naval Medical Research Unit San Antonio and the US Army Dental and Trauma Research Detachment. In October 2014, DECS went from being a detachment of the USAF School of Aerospace Medicine under the 711th Human Performance Wing and realigned under the 59th Medical Wing as a part of the 59th Dental Group.

CORE VALUES:

- Provide a responsive consultant service to Air Force Dentists
- Test, evaluate and provide consultation on dental equipment and materials
- Maintain a responsive website with information on new products, alerts, and infection control, manage CE lectures for military members
- Review AF Dental Facility construction projects and equipment requests
- Support Master's Degree level research for Tri-serviceresidency programs
- Collaborate with ADA and ISO on international dental standards
- Provide education support to federal dental residencies in material science

FUNCTIONS:

- Provide a responsive consultant service for Air Force dentists
- Test, evaluate and provide consultation on dental equipment and materials
- Conduct basic, applied, and evaluative research in support of finding solutions to bridge Air Force dental knowledge gaps
- Maintain a responsive website with information on new products, alerts, and infection control, and manage dental CE lectures for military members
- Review AF dental facility construction and renovation projects and equipment requests via TurboTIGERS
- Support Master's Degree level research for Tri-serviceresidency programs
- Work together with Naval Medical Research Unit San Antonio and the US Army Dental and Trauma Research Detachment on biomedical research
- Collaborate with ADA and ISO on international dental standards
- Provide education support to federal dental residencies in material science

DECS is staffed with four officers that include a materials scientist, infection-control and patient safety fellowship graduates, as well as a dental laboratory technician, a dental assistant, and a biomedical equipment repair technician. Product evaluations are conducted by the personnel assigned to the Fort Sam Houston facility and coordinated with clinical users throughout the Air Force.

Additionally, our staff works closely with AFMOA Patient Safety and Quality divisions to insure the highest reliability in the safe delivery of dental care to our beneficiaries, be they in-garrison or expeditionary.

Furthermore, we coordinate the Military Dental Continuing Education program and have teamed up with SWANK and the USAF Post Graduate Dental School to provide world-class education presentations for CE credit that is accredited by the American Dental Association (ADA CERP) and is accepted by the Academy of General Dentistry for Fellow and Master Qualifications.

DECS is forging a path to the future with technology. There are two DECS websites, one exclusively for military personnel and the other for the public. Their content is similar involving product evaluations, materials information, infection control and patient safety items. DECS knows there is a plethora of information available to the clinician and the clinic staff. We hope to take that information and provide a road map to safe and effective clinical practice for the federal dental services. We welcome feedback on products to evaluate or issues that need our attention. Please feel free to contact anyone of the staff and we will get back to you as soon as possible.

Additional detailed information about the Air Force Dental Evaluation & Consultation Service (DECS) available at: <http://www.airforcemedicine.af.mil/DE>

FACT SHEET

San Antonio Military Health System (SAMHS)

PERFORMANCE PLEDGE: The San Antonio Military Health System (SAMHS) team promises to provide exemplary healthcare and promote a healthy community.

We pledge to our beneficiaries and partners to provide a safe, high-quality and positive experience that is **patient-centered and family supportive**.

As member of a strong inter-service team, we are committed to you and your health.

BACKGROUND: The SAMHS is led by Air Force (USAF) and Army (USA) general officers and is responsible for providing management and oversight of business, clinical, and educational functions of all Military Health System (MHS) medical treatment facilities (MTFs) located in the San Antonio metropolitan area. As one of the MHS' first Enhanced Multi-Service Markets (eMSM), the SAMHS is comprised of USAF and USA units that include:

The 59th Medical Wing (component command structure) with subordinate units:

- Wilford Hall Ambulatory Surgical Center
- North Central Federal Clinic
- Randolph Clinic
- Reid Clinic

Brooke Army Medical Center (component command structure) with subordinate units:

- San Antonio Military Medical Center (SAMMC)
- CPT Jennifer M. Moreno Primary Care Clinic
- McWethy Troop Medical Clinic
- Schertz Medical Home
- Camp Bullis Taylor Burk Clinic
- Westover Medical Home
- Corpus Christi Occupational Health Clinic
- Center for the Intrepid (CFI)

With these 10 MTF platforms, the SAMHS operates with a \$1.2B budget and 12K staffs who serve over 240K beneficiaries. As an integrated health system, the SAMHS continues to optimize the direct care system while strengthening the collaboration with Department of Veterans Affairs and Private Sector Care partners.

The SAMHS is dedicated to the highest quality, patient centered care with a clear focus on safety, access to care, and customer service, while providing first –rate graduate medical and other health education and training programs, conducting state- of-the-art research and maintaining the critical global readiness of all war fighters.

Establishment of SAMHS

The Defense Realignment and Closure Act (as amended through the National Defense Authorization Act for 2006) directed changes to the MHS' organizational roles, responsibilities, and locations within Joint Base San Antonio.

- Memorandum of Agreement establishing the SAMHS was signed by the Chiefs of Staff of the Air Force and Army on 27 Sep 10
- SAMHS activated on 15 Sep 11
- Deputy Secretary of Defense Memorandum, *Implementation of the Military Health System Governance Reform*, 11 Mar 13; and designated the SAMHS as one of the first, six eMSMs with an Initial Operating Capability (for enhanced authorities) as of 1 Oct 13.

eMSMs

Six eMSMs designated across the MHS—Colorado Springs, Colorado; National Capital Region; Oahu, Hawaii; Puget Sound, Washington; San Antonio, Texas; and Tidewater Virginia with enhanced authorities that include:

“...direct the adoption of common clinical and business functions for the market...”

“...direct the movement of workload and workforce between MTFs...”

Community Partnerships/Collaboration

- Federal Health Care Consortium
- South Texas Regional Advisory Council (STRAC)
- San Antonio Mayor's Council of Fitness
- Greater San Antonio Chamber of Commerce Health & Bioscience Committee BioMed SA
- VA/DoD Integrated Disability Evaluation System (IDES)
- North Central Federal Clinic joint venture between AF and VA

State-of-the-Art Healthcare

- Largest DoD inpatient facility
- Only DoD Level 1 trauma center in United States with 425 inpatient beds and 24 operating rooms for inpatient and ambulatory surgery, providing trauma care to both DoD beneficiaries and the local community
- Largest DoD Outpatient Ambulatory Surgical Center
- Only DoD American Burn Association verified Burn Center
- Only DoD Bone Marrow Transplant Unit and Hematology/Oncology Clinic—Ranking among the top cancer programs in the nation
- High-Tech Center for the Intrepid provides full spectrum of amputee rehabilitation as well as advanced outpatient rehabilitation for burn victims and limb salvage patients with residual functional loss
- Only DoD rooftop helipad for patient transport

FACT SHEET

San Antonio Uniformed Services Health Education Consortium (SAUSHEC)

MISSION: We improve military health and readiness by graduating physician-officers and graduate allied health-officers who are ready to meet the needs and challenges of the Military Health System and our beneficiaries through professional leadership, clinical competence, and a commitment to scholarship, quality improvement, and patient safety

VISION: We strive for a training Consortium characterized by:

- Motivated physician-officer and graduate allied health-officer role models leading and teaching in all of our programs
- Military-unique clinical learning environments characterized by teamwork with excellence in clinical care, scholarship, safety, and professionalism
- Residents and fellows prepared to become competent, humanistic physician-officers and graduate allied health-officers who place the needs and well-being of patients and their country first

VALUES: Excellence – The synergy of *Teamwork and Excellence*

The SAUSHEC is a renowned graduate medical education program with 36 GME programs and military residents in training. Residents are among the top rated in the nation in board certification.

STRATEGIES:

- Oversee and ensure that all training programs comply with requirements of the Accreditation Council for Graduate Medical Education and other GAHE accrediting agencies, are of the highest caliber, and meet the readiness needs of the DoD.
- Organize to meet the core elements of our mission through subcommittees tasked with routine assessment and improvement of the Consortium.
- Prioritize development of our faculty and trainees into effective leaders and mentors
- Routinely collaborate and communicate with major teaching sites to ensure alignment with missions of these organizations.
- Collaborate with other teaching sites to improve the quality of the clinical learning environment.
- Sustain a supportive learning and practice environment focused on maximizing faculty and trainee well-being.
- Ensure that all trainees have the appropriate education, resources, and opportunities and are subject to the same standards within each program.

GME PROGRAMS:

- Allergy/Immunology
- Anesthesiology
- Dermatology
- Diagnostic Radiology
- Musculoskeletal Radiology
- Emergency Medicine
- Emergency Medical Services
- EM Ultrasound
- Internal Medicine
- Cardiology
- Endocrinology
- Gastroenterology
- Hematology/Oncology
- Infectious Disease
- Nephrology*
- Pulmonary CC
- Rheumatology
- Sleep Medicine
- Neurology
- Nuclear Medicine
- Obstetrics/Gynecology
- Ophthalmology
- Otolaryngology
- Pathology
- Cytopathology
- Pain Medicine
- Clinical Research
- Pediatrics
- Adolescent Medicine
- Neonatology
- General Surgery
- Surgical Critical Care
- Orthopedic Surgery
- Psychiatry*
- Transitional
- Urology

* University of Texas Health Center San Antonio (UTHSA) Sponsored Program

The Graduate Allied Health Education Programs (GAHE) falls under SAUSHEC. The GAHE contains 20 programs, supported by a variance of sponsorships and multiple accrediting agencies. GAHE programs include:

AIR FORCE

- Clinical Health Psychology
- Clinical Psychology Intern
- ENT PA
- Clinical Pastoral Education
- General Surgery PA

AF/ARMY PROGRAMS

- EM PA
- Pharmacy Practice
- Dietetic Internship
- Neuropsychology Fellowship

ARMY

- General Surgery PA
- Orthopedic PA
- Primary Care Optometry
- Occupational Therapy
- Ortho Physical Therapy
- Clinical Pastoral Education

- Clinical Social Work
- Clinical Psychology Intern

- Clinical Psychology Resident
- Clinical Health Psychology Fellowship
- Trauma and Resilience Fellowship/Social Work

FACT SHEET

Texas Biomedical Research Institute and Biomedical Research San Antonio (BioMed SA)

MISSION: To accelerate growth of the healthcare and bioscience sector, create regional economic benefit, and contribute to the health of San Antonio and beyond by establishing San Antonio as a leader in healthcare and bioscience.

HISTORY:

The Texas Biomedical Research Institute began as the scientific dream of its founder, Thomas Baker Slick Jr. A businessman, inventor, oilman, rancher, engineer, philanthropist, peacemaker and adventurer, Tom Slick might best be described as a visionary. Motivated by the philosophy that the welfare of mankind could best be advanced through scientific endeavor, he dared to imagine a “city of science” in South Texas that could be a “great center for human progress through scientific research.” At the time many people believed his grand ideas were impractical, he succeeded in establishing three premier scientific research organizations that continue to carry out his vision: the Texas Biomedical Research Institute, Southwest Research Institute, and the Mind Science Foundation.

On December 16, 1941, when he was only 25, Tom Slick, Jr. established the Foundation of Applied Research (FAR) by a trust indenture. Endowed with 1,875 shares of the Slick-Urschel Oil Company, FAR’s mission was to provide fundamental research and advanced education, covering agricultural research, the natural sciences and medicine. FAR’s name was changed in 1952 to the Southwest Foundation for Research and Education, succeeded by the Southwest Foundation for Biomedical Research in 1984. In 2011, the name was changed to Texas Biomedical Research Institute.

The Healthcare Bioscience Development Corporation (BioMed SA), formed by San Antonio community and industry leaders during 2005 to build upon the city's impressive base of biomedical assets and raise its visibility nationally and beyond. This initiative was based on the realization that, despite the significant size of the local healthcare and bioscience industry and its importance to the local economy, San Antonio is not well recognized for its unique biomedical assets. The City of San Antonio, Bexar County and CPS Energy provided grants totaling \$250,000 to launch BioMed SA as a non-profit corporation and public/private partnership. This was done at the request of Henry Cisneros and Joe Krier, representing The Greater San Antonio Chamber of Commerce. BioMed SA subsequently received tax-exempt status from the IRS as a 501(c)(6) organization.

Saving Lives with the Power of Scientific Discovery:

Texas Biomedical Research Institute aims to unravel the mysteries of chronic and infectious diseases through innovative thinking, creative problem solving and cutting edge technologies.

We Make Today's Discoveries Possible of Becoming Tomorrow's Cures:

Since its founding in 1941 by Thomas B. Slick Jr., the Texas Biomedical Research Institute has gained worldwide recognition in scientific and academic communities for the quality of its basic research. Our scientists work each and every day to improve human health by being a world leader in lifestyle and infectious disease research. Each year, our scientists are engaged in more than 200 research projects and publish well over 100 articles in the international scientific literature.

STRATEGIES:

- Aligning and leveraging San Antonio's healthcare and bioscience assets
- Promoting San Antonio as a city of science and health
- Convening and connecting sector participants to foster collaboration
- Identifying and mobilizing resources to fund sector growth
- Building awareness of sector career opportunities, promoting the development of homegrown talent, and attracting outside talent

OBJECTIVES:

- San Antonio will be a "magnet" and "destination" for biomedical companies, research talent, clinicians, educators, entrepreneurs, investors, health-related philanthropists, and consumers seeking advanced medical care. San Antonio will be a fertile "breeding ground" for homegrown biomedical companies, research talent, clinicians, educators, entrepreneurs, investors, and health-related philanthropists, and will offer the advanced medical care its citizens need without having to go elsewhere.
- San Antonio's healthcare and bioscience sector will be recognized as a powerful platform for launching medical cures and treatment initiatives in specific therapeutic areas, while maintaining the critical mass necessary to support emerging capabilities in any and all therapeutic areas.
- San Antonio will consistently attract the brightest talent across the healthcare and bioscience industry including researchers, scientists, clinicians, entrepreneurs, and educators with entrepreneurial experience. We are first and foremost in their minds for employment.
- San Antonio will have a high quality workforce by building the local infrastructure needed to develop homegrown talent and expose students at every level (P-16) to the educational and career opportunities available within the city's healthcare and bioscience sector.
- San Antonio will be well funded for growing, developing and attracting healthcare providers, research organizations, health professions educational institutions, and established and emerging biomedical companies. Funding sources will include philanthropy, investment capital, research grants, government contracts, educational funding allocations, and medical tourism revenues from healthcare consumers coming from outside the region.
- BioMed SA will demonstrate its value to the community and grow its resources to sustain itself as an organization through continuity of leadership, stability of management, and ongoing commitment of members and funders.

EXTRAORDINARY RESOURCES:

Biosafety Level 4 Laboratory

Developing vaccines and therapies to successfully treat some of the world's deadliest diseases for which there are no known treatments or vaccines requires the safest laboratory in the world in which to study them. Texas Biomedical Research Institute is home to one of only six such labs in North America and the only operational BSL-4 lab owned by a private institution.

Designed for maximum containment, BSL-4 labs offer a safe setting for scientists and the surrounding environment. This unique resource has allowed scientists in Texas Biomed's Department of Virology and Immunology to become world leaders in the fight against emerging diseases and bioterror agents, such as SARS, Anthrax, Ebola virus and more.

Southwest National Primate Research Center

Because of Texas Biomed's extraordinary primate resources and its distinguished history in the humane and appropriate use of animals in research, the National Institutes of Health awarded funding in 1999 for it to establish the Southwest National Primate Research Center, one of only seven National Institutes of Health National Primate Research Centers.

Because of their close similarity to humans in genetics and physiology, nonhuman primates fulfill a unique and critical role in efforts to understand human health and disease. By studying these animals in a controlled environment, scientists can develop a better understanding of the biological processes that underlie and contribute to disease. This information is then used to develop new, more effective ways to prevent and treat disease for the benefit of both humans and animals.

Genomics Research Center

The advancement of statistical methods for genetic epidemiological research, and in particular for genetic linkage analysis, has been a long-term and highly successful focus of research in Texas Biomed's Department of Genetics. Texas Biomed is home to one of the world's largest computer clusters for human genetic and genomic research. Complicated analyses that once took months can now be completed within minutes.

We now have a manual to our genetic code, and we can read it. What remains to be learned is how small genetic changes make a difference in the expression of those genes and whether or not those changes also make a difference in the development of specific diseases.

Our challenge is to investigate the molecular and cellular steps leading up to the final outcome. Texas Biomed is home to the combined expertise of protein science, metabolic science, genetics and complex data integration and analysis with state-of-the-art high throughput instrumentation, such as a mass spectrometer. These tools, not typically available to a genetics group under one roof, place scientists at Texas Biomed in a unique position to understand the entire genetic picture and help gain a better understanding of the heritability and risk of disease.

For more information: <http://www.biomedsa.org/about>

FACT SHEET

San Antonio Economic Development Foundation (SAEDF)

The San Antonio Economic Development Foundation (SAEDF) is a private, nonprofit organization that assists businesses and industries locate and expand into the San Antonio area. SAEDF is supported by its partners (City of San Antonio, Bexar County, CPS Energy, SAWS) and more than 165 Board Members. SAEDF is governed by an Executive Committee, represented by the business and corporate leadership of San Antonio. Since 1975, SAEDF has assisted over 450 companies with their location and/or expansion plans, creating more than 110,000 jobs for San Antonian's. Specifically, in the last five years, SAEDF has helped locate and expand 114 companies, generating 25,200 new jobs and fueling a total economic impact of more than \$5.5 billion.

SAEDF provides businesses with information to assist in the analysis of establishing or relocating a facility in San Antonio. Professional assistance with relocation analysis is handled with confidentiality and at no cost to our clients. Services include:

- Analyze labor market
- Arrange community briefing and custom city tours
- Introduce / meet with community partners
- Identify and package all local / state incentives applicable to your business
- Organize any specialized market research
- Follow through with the development process

HISTORY:

San Antonio is now the 7th largest city in America. The origins of San Antonio's commerce dates back to its history as a trading post and settlement of its five Spanish missions that are now designated a World Heritage site. On the cusp of celebrating our city's 300th Anniversary, San Antonio's economy over the years has evolved into a stable, diverse economy through its evolving industry sectors: advanced manufacturing, bioscience, financial services, logistics/distribution, new energy, IT/cybersecurity, military/defense. Leading companies such as USAA, NuStar Energy, Toyota Motor Manufacturing Texas, Valero Energy, HoltCat, Tesoro, Zachry, Frost, Rackspace, Medtronic, H-E-B and many others successfully operate in San Antonio. Since the establishment of the SAEDF over 40 years ago, San Antonio has seen a period of dramatic and diverse industry growth.

San Antonio builds upon its rich history and today is a center of activity and growth, attracting companies and young professionals defining an era of limitless opportunity.

For more information: <http://www.sanantonioedf.com/> and <https://www.txbiomed.org/>

FACT SHEET

ACADEMIC NETWORK OF CONSERVATIONAL HIP OUTCOMES RESEARCH (ANCHOR)

The ANCHOR study group is administered at Washington University. This study group is focused on improving the diagnosis and treatment of adolescent and young adult patients with pre-arthritis hip disease (femoroacetabular impingement and dysplasia). The study group currently includes 15 surgeons at nine institutions. Investigators collect prospective multi-center data on hip preservation procedures including outcome measures of hip function, hip pain, quality of life, overall health, high-level activity, and economic value.

Data collected is imagined to lead to improved patient care as well as a foundation for future, more sophisticated clinical outcomes studies. The ANCHOR group is committed to high-level clinical outcomes research, and encompasses an outstanding collection of dedicated surgeons and clinical researchers. The ANCHOR study group shares the vision of improving care for patients afflicted with pre-arthritis hip disease. A few representative publications from the ANCHOR group are:

1. A Systematic Approach to the Plain Radiographic Evaluation of the Young Adult Hip
2. Periacetabular Osteotomy for Acetabular Dysplasia in Patients Older than 40 Years
3. Multicenter Study of Complications Following Surgical Dislocation of the Hip

Anchor Orthopedics have developed a minimally invasive, easy-to-use Tissue Approximation Kit for use in herniated disc repair procedures. The group, envisions products that help surgeons preserve and strengthen the natural anatomy of patients. Guided by this vision, they design, develop and manufacture surgical devices through an iterative design process. Engineers work closely with surgeons to develop solutions that address unmet clinical needs.

Anchor Orthopedics aims to provide surgeons with novel solutions that optimize procedures in disc repair in an effort to preserve the biomechanics of the patient. Anchor Orthopedics' mission is to work closely with surgeons on all aspects of development to create superior clinical solutions that serve to improve the lives of patients around the world.

Extensive scientific and usability research studies has been conducted to optimize the design and surgical techniques for all of our clinical solutions. ANCHOR facilities are located in Boston (USA), Munich (Germany), London (UK), Toronto and Montreal (Canada). For more information, contact us at info@anchorortho.com.

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